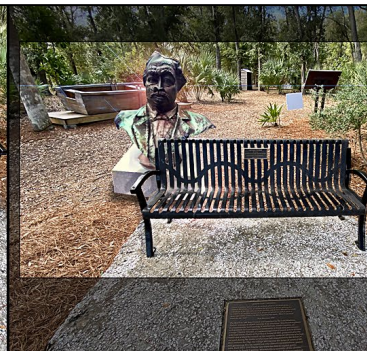




Artbreeder.com images by
Topher Maraffi,
James Jean-Pierre,
and Andres Venton
FAU Fall, 2020



Mitchelville XR Tour: Using AI and 3D Tools to Visualize History



Reconstruction Summer Institute 2022

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NCSU Department of Art & Design

NC STATE
UNIVERSITY

Mitchelville Historical Tour Project

- **NEH & Epic Games Megagrant Funded Project.**

<https://tophermaraffi.com/2020/06/08/mitchelville-ar-tour/>



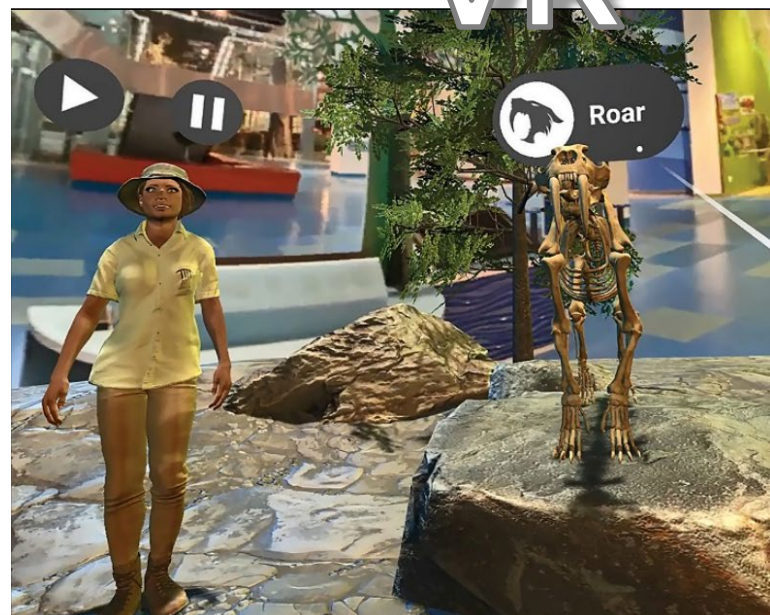
NATIONAL
ENDOWMENT
FOR THE
HUMANITIES



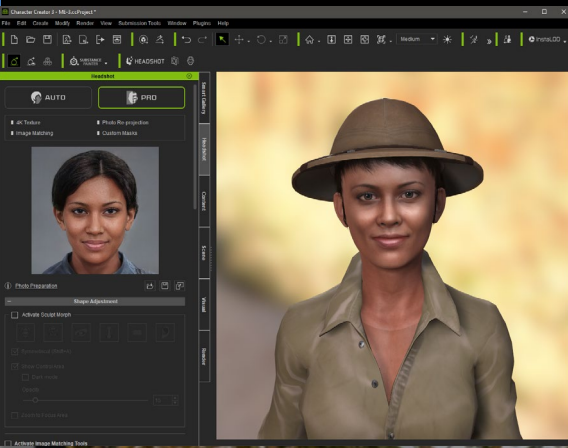
- **Free augmented reality tour app for mobile phones, and other virtual-mixed reality headset experiences.**
- **Visualize Mitchelville scenes and related narratives of emancipation and Civil Rights in Beaufort County.**
- **Collaborate with Gullah community leaders, artists, and experts to develop an immersive experience that will be accessible and sustainable.**



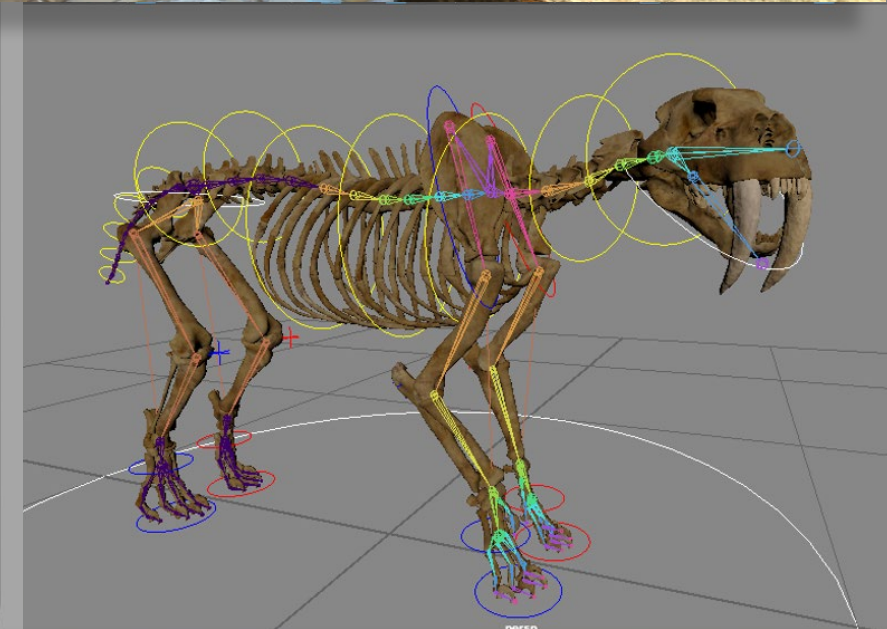
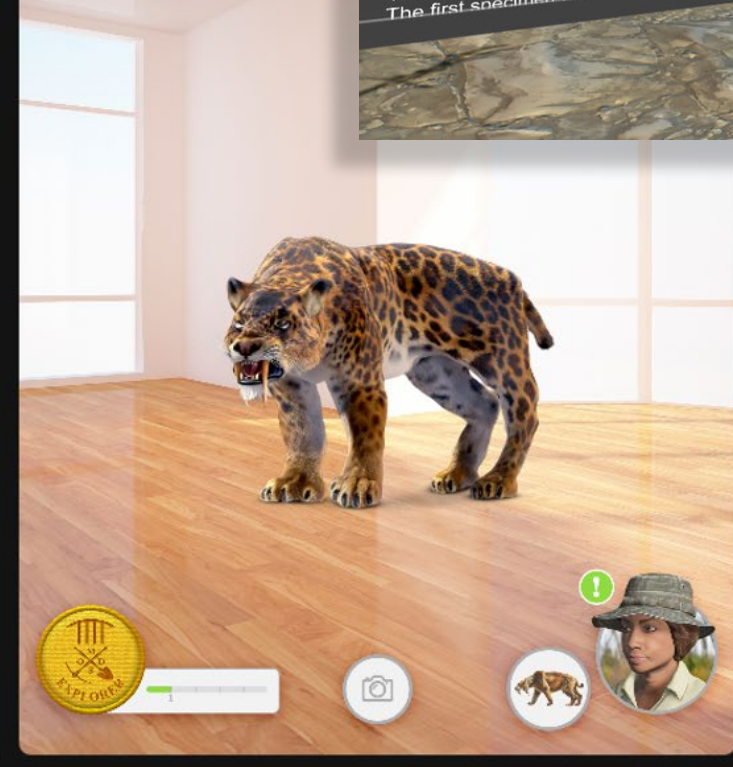
XR Development for Content Accessibility



Related Work: Prehistoric FL MFA Project for MODS



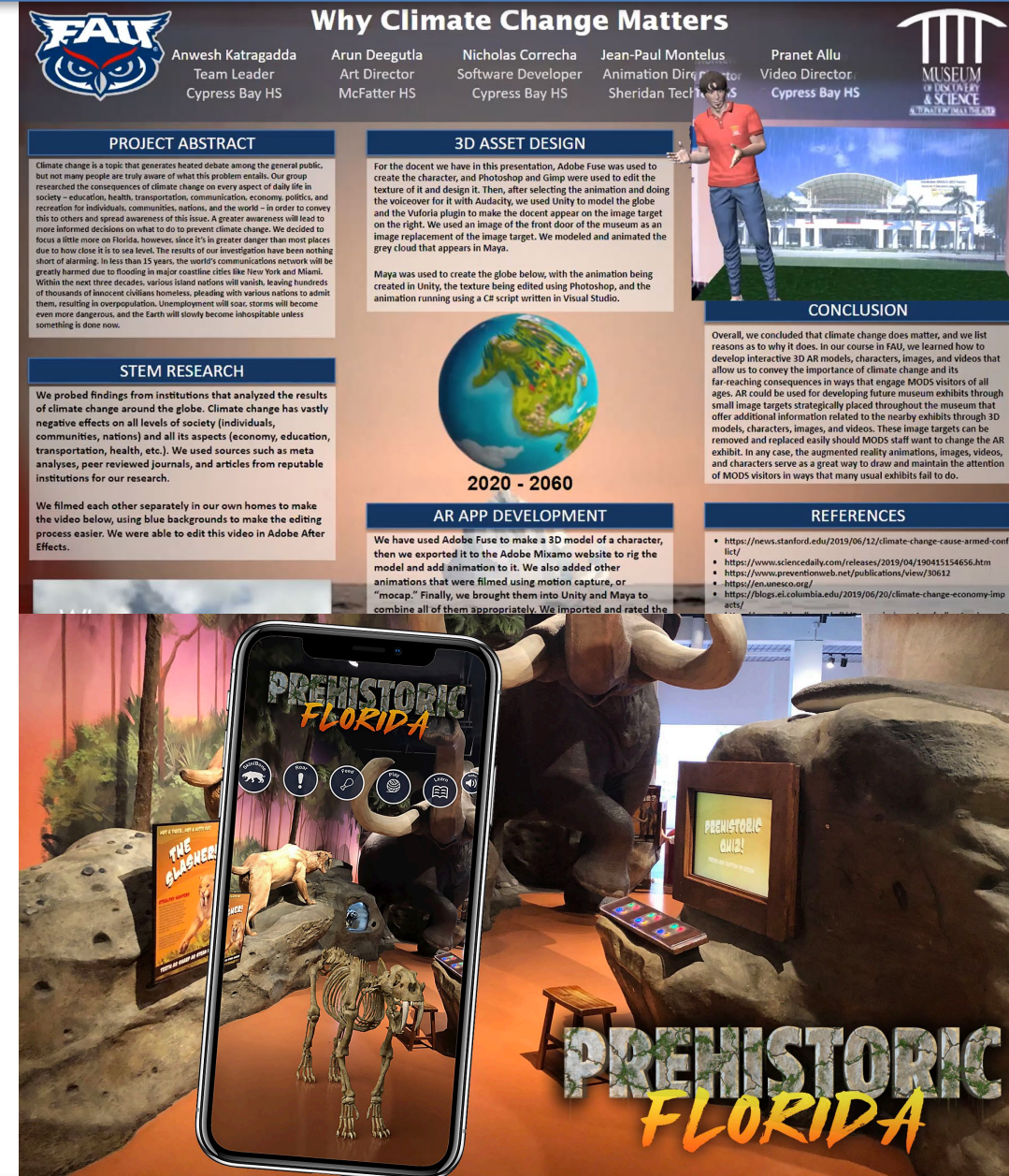
https://tophermaraffi.files.wordpress.com/2020/06/prehistoricfl_mods_demo_2020.mp4



All designs by MFA student Richie Christian, 2020-2021

App-titude Summer School Model

- App-titude summer program at Museum of Discovery & Science in Fort Lauderdale (MODS)
- Projects to teach STEAM (STEM+Art) to high school students
- STEM research posters with AR 3D animation and documentary video
- Model for a similar program proposed for Mitchelville, only for history and heritage content



Making the Impossible Possible

- The most impressive VR entertainment experiences can transport you to impossible worlds.
- The VOID VR theaters used performative principles from stage magic to create playful experiences.
<https://www.youtube.com/watch?v=xcHmS48nN48>
- Room-scale VR games like Vader Immortal create a balance of narrative, competitive, and performative play.
- Can we apply a similar experiential approach to edutainment projects that take people on a virtual journey back in time at a museum or historical site?



Flesh & Sand VR (2017)

LA INSTALACIÓN

CARNE Y ARENA

DE ALEJANDRO GONZÁLEZ IÑÁRRITU
Y EMMANUEL LUBEZKI, LLEGA A
LA CDMX EN AGOSTO



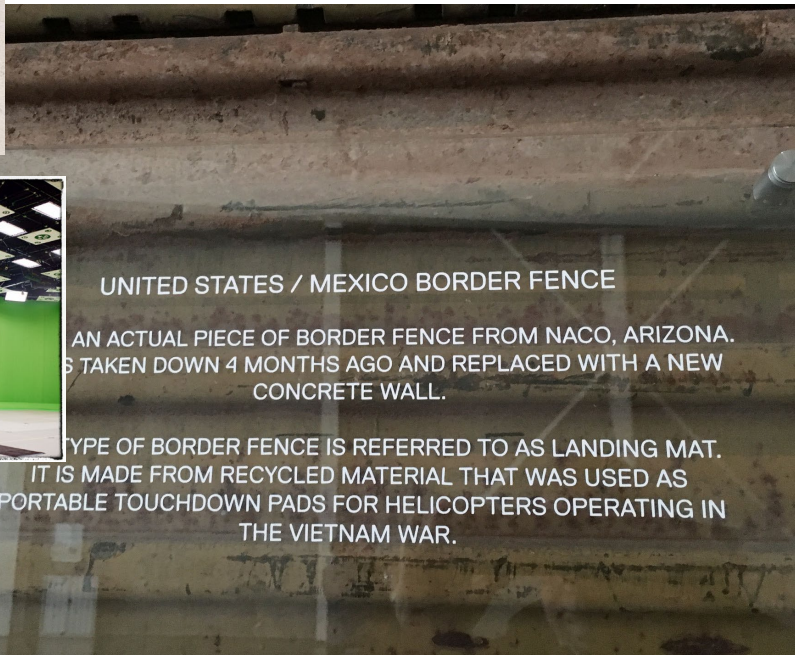
(Smith, 2019)



“...it’s part theater, part documentary, and it’s part-physical installation, it’s a virtual installation — it’s many different arts combined. For me that was fascinating, and the decision to work with real immigrants, to take from them their true experience that they share.” - Alejandro Iñárritu,

<https://www.youtube.com/watch?v=zF-focK30WE>

- Inarritu interviewed immigrant refugees on their experiences, and invited them to perform the virtual characters in the VR scenes.



UNITED STATES / MEXICO BORDER FENCE

AN ACTUAL PIECE OF BORDER FENCE FROM NACO, ARIZONA.
TAKEN DOWN 4 MONTHS AGO AND REPLACED WITH A NEW
CONCRETE WALL.

THIS TYPE OF BORDER FENCE IS REFERRED TO AS LANDING MAT.
IT IS MADE FROM RECYCLED MATERIAL THAT WAS USED AS
PORTABLE TOUCHDOWN PADS FOR HELICOPTERS OPERATING IN
THE VIETNAM WAR.

- Room-scale VR experience that was collaboration between Inarritu, ILMxLab, and the undocumented community.



I Am A Man VR (2018)

Narrative VR can “tap into the emotions” of the user and “tell a much richer story” than an artifact behind glass in a museum, Ham explains. Facts and photos come alive in VR with the help of music, lighting, and other intricately planned details, creating an “intense” experience that encourages empathy and connection.— Derek Ham (Klocke 2018)

<https://www.youtube.com/watch?v=FkXHPgQ0ftc>

- Interactive 3D scenes of 1968 Memphis sanitation labor strike with “I Am a Man” march, TV news on Civil Rights struggles of the time, and the Lorraine Motel where Dr. King was assassinated.
- Avatar affords the role of a black sanitation worker, and has agency to explore and pick up some objects, but you can’t join the marchers in the main scene.



(Pitts 2008)



Time's The March VR (2020)

“When you watch these stories, they’re more powerful, because you’re actually experiencing them instead of reading about them.”

— Alton Glass, Co-creator of Time’s The March VR Experience

<https://time.com/5784009/martin-luther-king-jr-virtual-reality/>

- Room-scale immersive VR installation with a hyper-real Dr. King at the DC Civil Rights march that culminated in his “I have a Dream” speech.
<https://www.youtube.com/watch?v=L5VHE0hGV6Y>
- Time magazine, Alton Glass, and Viola Davis collaborated with film visual effects company Digital Domain (Titanic, Avatar, etc) to simulate virtual travel to a specific time and place in Civil Rights history.



Developing Mitchelville Scenes with AI-3D-XR Pipeline

- Design and prototype three initial scenes at locations around the park: 1) 1863 Emancipation Day Celebration. 2) 1863 Combahee River Raids. 3) 1862 Robert Smalls Escape from Charleston.
- AI driven design of 3D historical figures like Tubman and Frederick Douglass are created from source photography, and performance capture in a game engine is used for virtual production of the scene content.

https://tophermaraffi.files.wordpress.com/2020/06/mitchelvilletourdesigndocfin_maraffi_2020.pdf



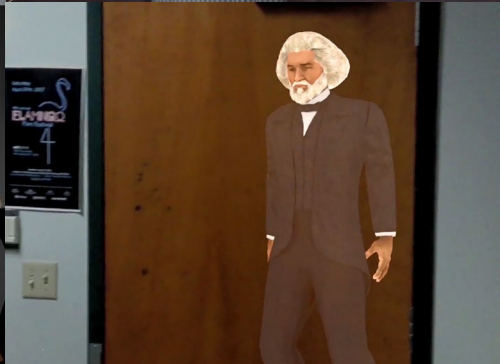
Harriet Tubman model by
Ledis Molina, Spring 2020

Frederick Douglass model by Andres Venton, Fall 2020

Mitchelville Preproduction Designs and 3D Prototypes (2019)



Model and textures by James Jean-Pierre, 2019



Harriet Tubman Combahee River Raids by Dawn Davidson



1. Camera Angle MLS Zoom out to LS, blocking starts on the back of Harriet's Shirt, and transitions dissolve. "Finding where the explosive are."



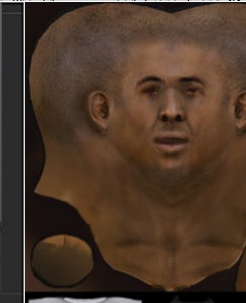
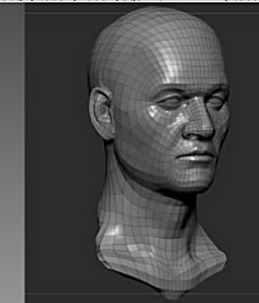
4. Camera angle MS Truck Pan Right to Left, blocking



5. Camera angle MLS, blocking on grass, and



6. Camera angle XLS P



Model and textures by James Jean-Pierre, 2019

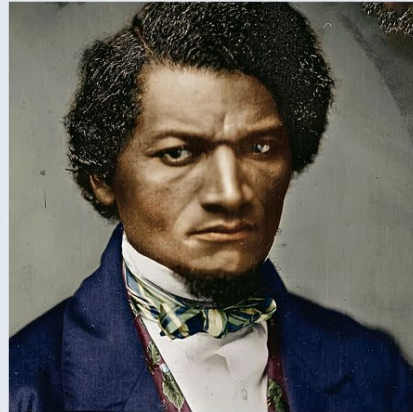
Frederick Douglass
1818-1895

https://tophermaraffi.files.wordpress.com/2020/07/mitchelvilletour_designvideo_summer2020.mp4

VR scene and 3D models by MFA students Ledis Molina & James Jean-Pierre, Spring-Fall 2020

Designing Historical Figures using AI Tools (2020)

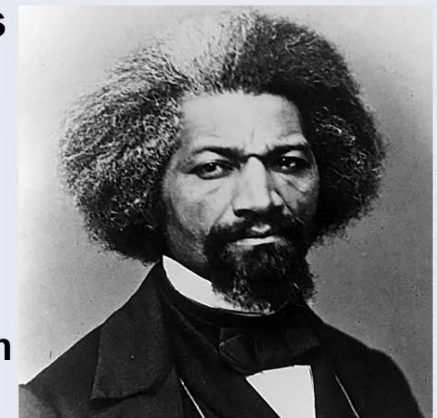
- **Use GAN-based AI tools to create realistic full-color designs of historical figures like Harriet Tubman and Frederick Douglass to utilize for generating 3D models and texture maps.**



Mitchelville AR Project: Frederick Douglass

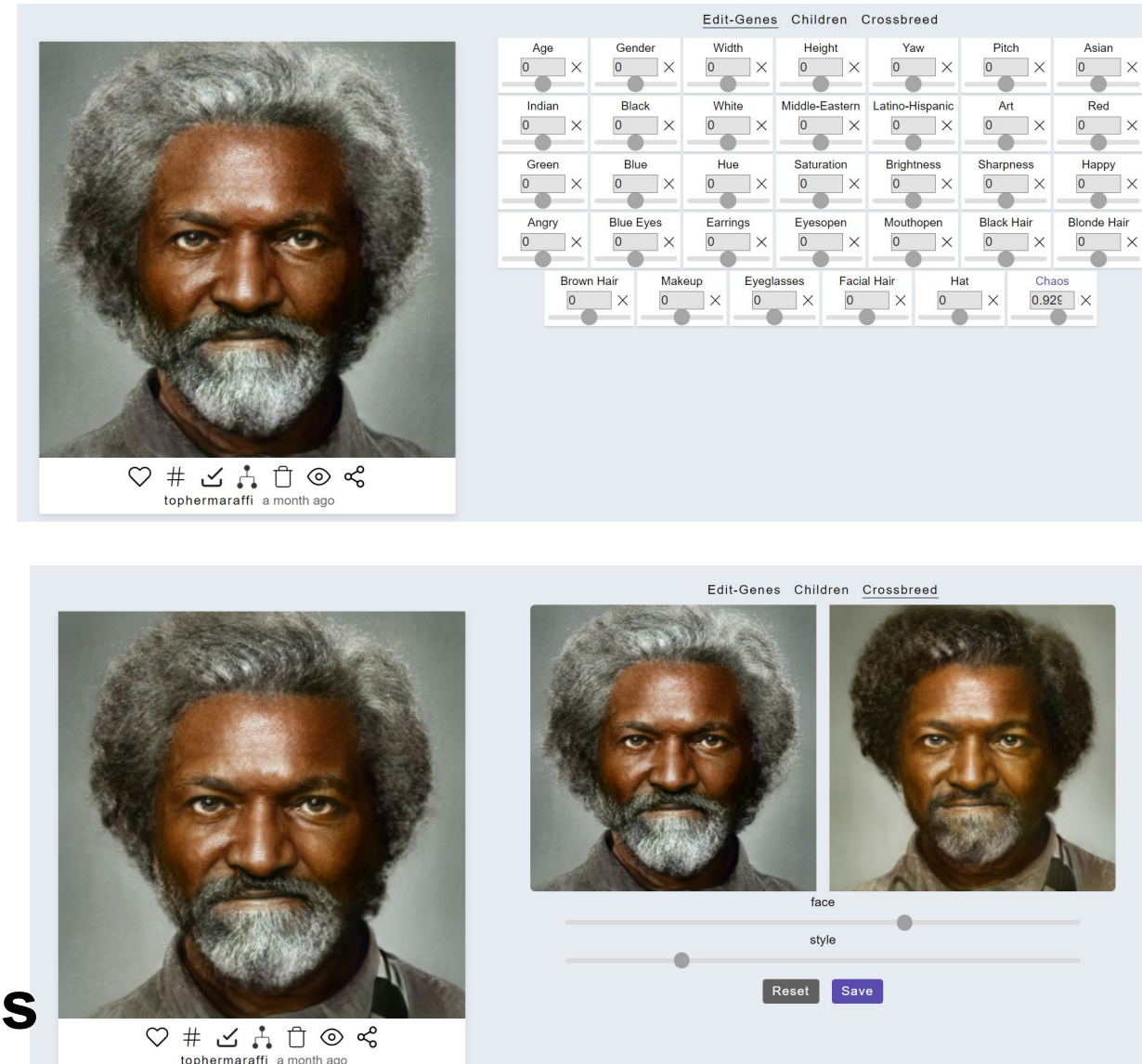
AI Character Design with GANs Breeding (top) at Artbreeder.com using historical photos from the National Archives as input (bottom)

Breeding done by Topher Maraffi & Andres Venton
Fall, 2020



AI Tools for Art Generation

- **GANs used with neuro-evolutionary breeding are enabling artists to use AI to generate creative imagery**
- **Artbreeder.com is a new online tool that combines DeepMind's BigGAN and UCF's Picbreeder into an intuitive user friendly interface for generating images**
- **BigGAN leverages ImageNet's large database, and allows artists to easily merge visual features**



Mitchelville Project: Harriet Tubman Designs



Mitchelville AR Project: Harriet Tubman

AI Character Design with GANs Breeding (top) at Artbreeder.com using historical photos from the National Archives as input (bottom)

Breeding done by Topher Maraffi, Andres Venton and James Jean-Pierre, Fall 2020

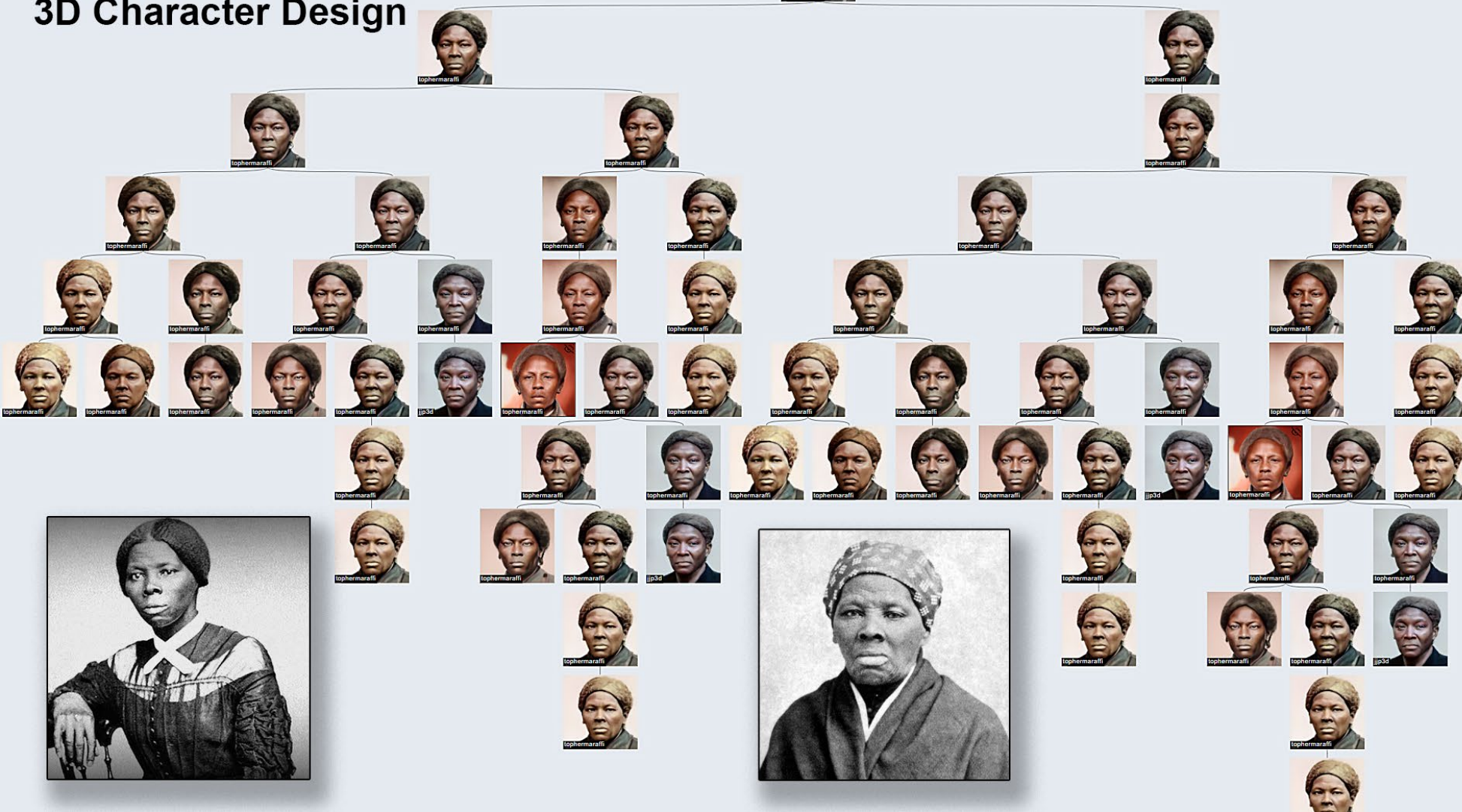


Mitchelville Project: Harriet Tubman Artbreeder Tree

Mitchelville XR Project: Harriet Tubman 3D Character Design



GANs AI Breeding at Artbreeder.com



Artbreeder.com images by
Topher Maraffi,
James Jean-Pierre,
and Andres Venton
FAU Fall, 2020

Henry P. Moore Drayton Plantation Photography (1862)



<https://www.loc.gov/photos/?fa=contributor:moore,+henry+p.&q=Henry+P.+Moore+1862>

3D Game Engine VR Simulation

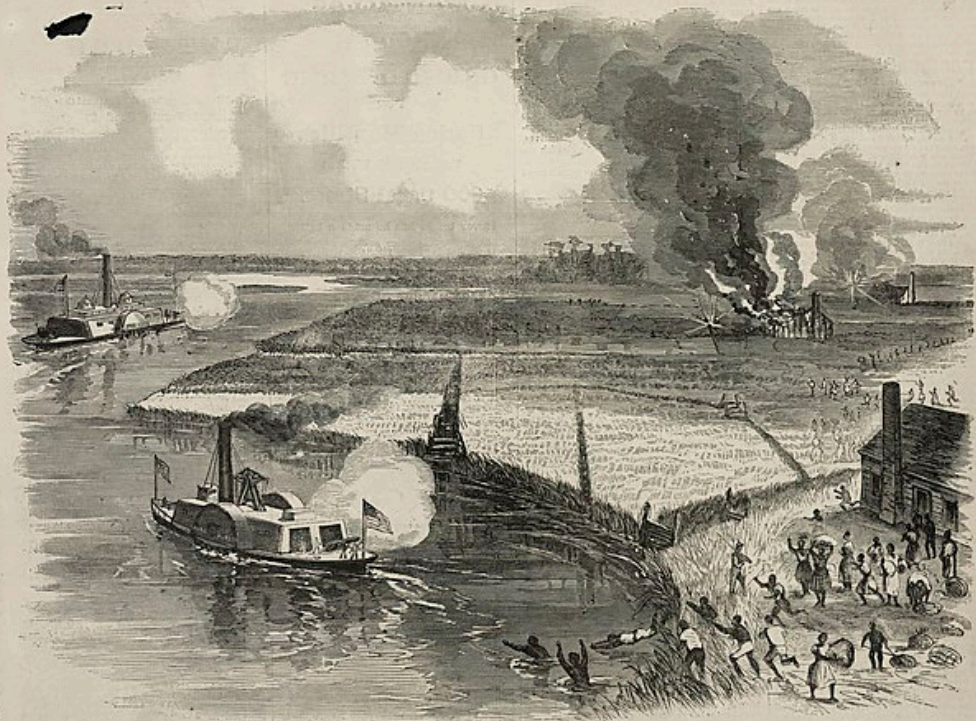


Combahee River Raids (Harper's Weekly July 4th, 1863)

JULY 4, 1863

HARPER'S WEEKLY.

429



RAID OF SECOND SOUTH CAROLINA VOLUNTEERS (COL. MONTGOMERY) AMONG THE RICE PLANTATIONS ON THE COMBAHEE, S. C.—[SEE PAGE 427.]

A TYPICAL NEGRO.

We publish herewith three portraits, from photographs by M'Pherson and Oliver, of the negro Gontoux, who escaped from his master in Mississippi, and came into our lines at Baton Rouge in March last. One of these portraits represents the man as he entered our lines, with clothes torn and covered with mud and dirt from his long race through the swamps and bayous, chased as he had been for days and nights by his master with several neighbors and a pack of blood-hounds; another shows him as he underwent the surgical examination previous to being mustered into the service—his back furrowed and scarred with the traces of a whipping administered on Christmas-day last; and the third represents him in United States uniform, bearing the musket and prepared for duty.

This negro displayed unusual intelligence and energy. In order to foil the scent of the blood-hounds who were chasing him he took from his plantation onions, which he carried in his pockets. After crossing each creek or swamp he rubbed his body freely with these onions, and thus, no doubt, frequently threw the dogs off the scent.

At one time in Louisiana he served our troops

as guide, and on one expedition was unfortunately taken prisoner by the rebels, who, infuriated beyond measure, tied him up and beat him, leaving him for dead. He came to life, however, and once more made his escape to our lines.

By way of illustrating the degree of brutality which slavery has developed among the whites in the section of country from which this negro came, we append the following extract from a letter in the New York Times, recounting what was told by

the refugees from Mrs. GILBERT's estate on the Black River:

"The treatment of the slaves, they say, has been growing worse and worse for the last six or seven years. Flogging with a leather strap on the naked body is common; also, paddling the body with a hardwood until the skin is a mass of blisters, and then breaking the blisters with the teeth of the slave. They have 'very often' seen slaves stretched out upon the ground with hands and feet held down by followers, or laid on an iron bedstead in the ground for 'flogging.' Handfuls of dry corn-brake are then heaped, and the burning smoke is 'whipped' it with a stick, so as to fall in showers of live sparks upon the naked back. 'This is continued until the victim is covered with blisters.' If in his weakness of torture the slave gets his hands free to brush off the fire, the burning brand is applied to them.

Another method of punishment, which is inflicted for the higher order of crimes, such as running away, or other refractory conduct, is to dig a hole in the ground large enough for the slave to squelch in it. The victim is then stripped naked and placed in the hole, and a covering or grating of grove sticks is laid over the opening. Upon this a quick fire is built, and the live coals are raked through upon the naked skin of the slave, until his body is blistered and swells almost to bursting. With just enough of life to enable him to crawl, the slave is then allowed to recover from his wounds. If he cuds, or to end his sufferings by death.

"Clayton Shaw" and "Overton," two hands, were both murdered by these cruel tortures. "Shaw" was whipped to death, dying under the tortures, or soon after punishment. "Overton" was held naked upon his face and burned as above described, so that the ends of his legs and the



ISBURG.

ature drawn by
R. Davis, and

THE BRIGADES
ONEL SMITH.

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was unprisoned! His request was not granted. The rebels lost five cannon, 200 men killed, 400 to 500 wounded, and about 200 prisoners. Our loss is reported to be 100 killed and 500 wounded; but few of this number were white men.

A RAID AMONG THE RICE PLANTATIONS.

ON page 429 we illustrate the recent raid of Colonel Montgomery's Second South Carolina Volunteers (colored) among the Rice Plantations of South Carolina. The author of the sketch which we reproduce, Surgeon Robinson, writes as follows:

"ST. SIMON'S ISLAND, GEORGIA, June 5, 1863.

"I inclose you a sketch of the operations of Colonel James Montgomery (formerly of Kansas), of the Second South Carolina Volunteers (colored), in the interior of South Carolina, among the rice plantations on the Combahee.

"We destroyed a vast amount of rice, corn, and cotton, stored in the barns and rice-mills, with many valuable steam-engines. We broke the sluice-gates and flooded the fields so that the present crop, which was growing beautifully, will be a total loss. We carried out the President's proclamation too, and brought away about 800 contrabands, 150 of whom are now serving their country in the regiment which liberated them. The rest were old men, women, and children. The rebel loss from our visit must amount to several millions of dollars. We are now about commencing operations on the Georgia coast.

"We skirmished all day with the rebels, but escaped without the loss of a man. Their cavalry killed and wounded some of the slaves as they swarmed to the protection of the old flag."

<https://www.loc.gov/pictures/item/2014645368/>

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XR Scene Design for Combahee River Raid

- **Tour Guide:** Frederick Douglass as virtual tour guide. Harriet Tubman and first SC Gullah regimen as Non-player characters (NPCs).
- **Scene:** VR test uses 360 imagery as background that looks like the Praise House park location.
- **Screenplay:** Tubman leading first black Union troops to free enslaved up the Combahee river, from her biography and accounts. Douglass initial dialogue and narration adapted from Douglass' letter to Tubman.
- **Roleplay:** Douglass addresses visitors as abolitionists from the North, there to observe the Port Royal Experiment.
- **Gameplay:** Help Tubman emancipate enslaved Africans and bring them to Mitchelville as Freedmen.



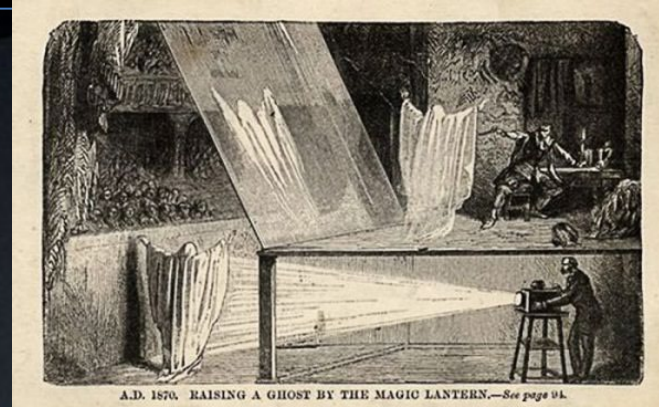
Douglass Script Adapted from Letter to Tubman in Bradford Bio (1869)



Frederick Douglass, 1863



Disney's Hall of Presidents



3D Interactive Hologram

Future Work at NC State College of Design

- Collaboration with NC State faculty Derek Ham and others on the prototyping stage of the project.

<https://www.youtube.com/watch?v=bIHQmpIImjw>

- Using photogrammetry and the new Metahuman technology in Unreal game engine to preserve and share the stories of living Gullah Geechee elders through an interactive 3D hologram experience.

<https://www.youtube.com/watch?v=S3F1vZYpH8c>

- Applying new spatial design frameworks to developing XR prototypes for Reconstruction-era experiences throughout Mitchelville Freedom Park.



Recent Papers

- ***Stage Magic as a Performative Design Principle for VR Storytelling*** (2021) in Cinergie International Journal special issue on VR storytelling.

<https://cinergie.unibo.it/article/view/12234/13014>

- ***Multimodal Framework for Enhancing RPG Playfulness through Avatar Acting Affordances*** (2022) in the proceedings of the Digital Games Research Association Conference (DiGRA 2022).

https://tophermaraffi.files.wordpress.com/2022/05/maraffi_multimodalframework_extendedabstract_digra2022.pdf

- ***VR Storytelling for Social Justice and the Ethics of Playing Black Bodies*** (fall 2022) book chapter in “The Changing Face of VR: Pushing the boundaries of experience across multiple industries”, edited by Dr. Michael Saker and Dr. Jordan Frith for Vernon Press (prepress PDF).

<https://tophermaraffi.files.wordpress.com/2022/07/vrbook2022-prepress-author-proofs-chpt2-maraffi.pdf>