

Master of Fine Arts Thesis

I Thought the Future Would Be Cooler

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Dedicated to:

*The future robot potters at the New York State College of Ceramics at
Alfred University & Beyond*

I am revitalizing the metaphoric potential of the vessel form by utilizing technologies of clay 3D printing and rapid prototyping, to create bright cyborgian pottery objects that acknowledge early ceramic traditions while smiling towards the future. Working with tools that are digitally forward, I am deeply engaged in exploring the tension between past and future, probing the synergy between handmade arts and technology. Maintaining a sense of tactility, intimacy and sensitivity often achieved in traditional handworks is paramount to my practice. I lovingly dress these familiar forms with hand painted geometric patterns or hazy gradients and affix embellishments all over their surface to bring my hand back into the process. This interplay of the machine and my hands results in creation of objects that resist definition.

My vessels are future-forms that are designed to hold ideas or memories of the past. Influenced by the aesthetics of the earliest digital spaces I inhabited and the nostalgia I feel for those virtual worlds conditioned me to become a “world builder”. This concept is reflected in the microcosms constructed within the vessels as they stand in for the scale models of imaginary architecture, maquettes for future furniture, rolling strata of rice terraces and landscape paintings.

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Past and Future

There is a reoccurring dichotomy of past versus future present in multiple corners of my practice. I utilize technologies of clay 3d printing and rapid prototyping, while working with clay, a material deeply rooted in history and tradition. I aim to create future-forms that reflect and reconsider these past histories and craft traditions. Old and New color find harmony in the atmosphere of my work. The work is influenced by my earliest digital worlds while I am creating in new ones.

Digital Nostalgia

Every twenty years popular culture experiences a “20 year nostalgia cycle” where the old bygone ideas and styles are resuscitated and brought back to life. By that calculation, my generation is right on track for experiencing nostalgia for our early digital lives. “A longing for our first digital worlds, on screen spaces where we could act, create and communicate”¹. I recently began to reflect on the first digital worlds I experienced when I was younger. Primarily in video games and specifically, games referred to as “sandbox games”. The landscapes in these early “world building” games are like flat pixelated paintings, they are not at this time fully immersive. As the viewer explores the landscape by panning across flattened images of flora and fauna and front facing exteriors of architecture.

¹ Kyle Chayka, *“Pokémon and the First Wave of Digital Nostalgia”*, 2021

Sandbox Game

Rhino 3D, my modeling software of choice, is in essence a “sandbox game²”.

When opening the program a square grid and an infinitely expansive gray environment appears where scale and gravity don't exist. In this digital space, I developed an affinity for creating landscapes, regardless of what my intentions for form or function are. I open the software, start building vessels out of rudimentary geometric shapes, and when the model is completed, it inevitably reads as landscape, or an image of a landscape. Before I began 3D printing clay, my ceramic objects were clearly vessel, so what is it about digital tools that was moving me to create this terrain? These questions and a lingering nostalgia for the digital worlds of my childhood, made me realize that I am creating landscapes because I have been conditioned. When I sit down in front of my computer screen and open Rhino, muscle memory in my fingers only want or know how to create these other worlds. I become a world builder in a digital space.

World building is the process of creating an entirely new fictional space. It is not just about building out a physical environment, the history and story of the world you are creating are always part of the process. Prior to the 1900s, most worldbuilding was conducted by science fiction or fantasy novelists. In video games, an open-ended history and story of the world is provided. The player is tasked with physically building out the environment in the game and can adapt to the story as they choose. I feel like I am the architect of the worlds I am building in my printed vessels, I don't necessarily

² A sandbox game has gameplay elements that grant the player a vast degree of creativity to interact with, usually without predetermined goals. Often associated with open world concept, which gives the player freedom of movement and progression in the game's world. Some examples are The Sims, Animal Crossing, Stardew Valley and Minecraft.

feel responsible for creating a narrative or history. I build small sanctuaries for myself, leaving the work feeling open-ended enough for the viewer to project their own narratives.

Process of Translation

My earliest digital worlds were built on a 256 by 240 grid of pixels. Each pixel was one of fifty-four colors that came together to create environments and characters on screen.³ The graphics in These pixelated spaces were a rudimentary graphic style due to the capabilities of vintage computing, but this visual vocabulary influenced a generation of video games or digital spaces. Pixel art and 3d printed ceramics have a lot of commonalities. Obviously they both occupy a digital space but the way they are created shares the same logic. Pixel art is an image that is built using the same rudimentary shape to create a more complex image. 3D printed ceramics use extruded coils, which gets built up layer by layer to create a complex form. The nozzle size I use on my clay printer produces a coil scaled to my printed vessels as individual pixels are in an image. Considered as scale models of imaginary architecture, coil size in my printed work corresponds to different sizes of bricks or other modules of architectural construction or mirror the stratification of Vietnamese rice terraces.

3d clay printed objects are produced through a process of translation. A simple sketch on paper may translate to a physical model of the object that will eventually be printed in clay. Rendering the model in Rhino creates an .stl file and putting that file

³"The Evolving Landscape of Video Games", Allison Meier, 2013

through a slicer⁴ creates a .gcode⁵. Feeding that .gcode to your printer is similar to the childhood game “whisper down the lane” or “telephone”⁶. A phrase is passed down the line and by the time it reaches the last person, the saying or phrase might sound like the original, but inevitably information gets lost as it goes from person to person. 3d printing with clay goes through a similar process of translation. A perfectly smooth gray rhino model gets converted multiple times into different file formats. Through translating the object to a format that is printable, smooth surfaces are broken up into strata, some forms get simplified in the slicing and sometimes geometry ends up in unexpected places. Information lost is not necessarily a deficit but more often a welcome surprise.

Old and New Color

Old and new color find harmony in the palette of my work. Delicate greens, pale pinks, hazy blues, swampy shades of spring, and muted jewel tones meet florescent hot pinks, neon chartreuse, punchy cobalt, and unctuous oranges. The color is not the surface of the work but intrinsic to the clay. It's not surface and form but atmosphere and light. It's almost like the color is what creates the form.

⁴ A slicer or slicing software converts a 3d model to a specific instructions for the printer to read (.gcode - see below)

⁵ A .gcode file is the most widely used programing language associated with 3d printing or CNC milling. It is coded instructions that your printer reads in order to create an object.

⁶ Players form a line or circle, and the first player comes up with a message and whispers it to the ear of the second person in the line. The second player repeats the message to the third player, and so on. When the last player is reached, they announce the message they heard to the entire group. The first person then compares the original message with the final version.

Utopian Landscapes

One of my biggest design influences, Isamu Noguchi, a Japanese American artist, who is known predominately as a sculptor, also dreamed up utopian landscapes that evoked play and created a sense of belonging. While some scholars consider his landscapes to just be a stage for his sculptural work, Noguchi saw them as continuations of sculpture, or as he referred to it as “space as sculpture.”⁷ “The sculpting of space” allowed him to look beyond the confines of one material, to an environment where material, architecture and landscape meet.

I feel this kinship with Noguchi, both of us being biracial, trying to reconcile and navigate this double identity in our life and work. Our mutual draw to architecture, sculpture and landscape, creating our own utopias, physical sanctuaries separated from the chaos of the world and cultural definitions. His philosophies about play are what really drew me into his work, because play is so evidently present in my own.

In the 1930s, Noguchi designed “Play Mountain”, which was essentially a giant interactive public sculpture. It took form as a hybrid massive pyramid, temple and mountain, with a long slide that pushes out from the earth. Two separate staircases of varying step height are on one side of the mountain that lets users climb to its crest. “Play Mountain” came with no instructions, it had no rules and there was no single obvious way to play on it. Give children an abstract, surreal landscape, they are free to interpret it however they want. This philosophy would later be called “non-directive

⁷ Isamu Noguchi, *A Sculptor's World*

play.”⁸ Noguchi believed that creating these strange new landscapes would inspire children to imagine other realities, so that they would grow up to be open-minded and creative adults.⁹

The Anatomy of a 3-legged Vessel



Isamu Noguchi, "Three Leg Vase" 1952 The Noguchi Museum



Jolie Ngo, "3legged Vessel" 2021 (right, photo by Joe Kramm)

My 3-legged vessels are table top pottery objects that read as a maquette for future furniture. They are microcosms of surreal landscapes that feel vast and expansive while also being the size of a scale model train set. They are freaky little tripod creatures that work and play on your counter top. The original design inspiration for my 3-legged vessel series was influenced by Isamu Noguchi's "Three-Legged Vases".

Isamu Noguchi's "Three-Legged vase" were originally designed for Ikebana a type of floral arrangement that originated in Japan. Ikebana translates to "making flowers alive". Noguchi had this in mind when creating his series of three leg vases.

⁸ Ibid.

⁹ "Play Mountain" episode 351 of 99% invisible podcast, 2019

These forms have a flat thick slab that is suspended in the air by three thrown forms, one or two of those forms are usually hollow. Cut holes accommodate the legs connected to the slab. This slab mimics the ground, flower arrangements appear to sprout from the earth as they do naturally.

My 3-legged vessel have three anatomical parts: "The Legs", "The Ground" and "The Flora". As you travel from vessel to vessel, the components are variable and vastly different then ones you previously departed. There are no set boundaries as to how The Legs, The Ground and The Flora are built but they must be able to preform their role within the structure of the 3-legged vessel.

The Legs

The foundation of the 3-legged vessel are The Legs. The Legs take many forms; there are no set rules on what shape that they might take but their prescribed function is to be a supporting structure for The Ground and to hold The Flora. Usually 3D-printed porcelain coils spin their way into creating hollow forms or solid squiggly masses, but hand built or non-ceramic materials can take the role of a Leg as well. A wooden sphere with a pit removed from its center, a porcelain cat paw thrown on the wheel or an arrangement of stacked stones all preform their function as The Legs. From vessel to vessel, The Legs vary in scale, some stand tall so that the viewer can catch a glimpse of the underside of The Ground. Some may be invisible to the viewer unless they physically squat to see why the forms float just inches off of the table. With the varying degrees of height across all 3-legged vessels, the way they are arranged on a

table makes them look like islands that are home to their own distinct ecosystems. At least one, and at the most two of the legs needs to have the capacity to hold. The opening of the hollow cavity meets the ground plane, where there is a hole that matches the shape of The Leg's opening. This opening can be made a home to the Flora or it could just be filled with air.

The Ground

The Ground, the horizontal plane that stretches out in any directions and sits on top of The Legs. From a birds-eye-view, you can see the rendered edge of the plane, which might be made up of soft curves that gently flow into one another or energetic sharp angles jutting back and forth closing the curve. The breadth of the Ground is created by undulating hills that create valleys and crests for The Flora to grow out of. The plane rises and falls in a pattern that feels vast but the edge marks an abrupt drop off, not allowing the viewer to travel further. Similar to the edges of video game worlds, which are intended to feel expansive yet limited. If the player wants to explore the world where the game map ends, the game will present the player with misdirections or blockages, never allowing the player to see the spot on the map where the world truly ends. This landscape is always divide into at least two different sections that fit or stack together like a puzzle, fused to one another with glaze or brightly tinted epoxy. The two or more different sections often look like they are slices of one landscape that was never properly joined together in its original format, making the seam where they meet present, revealing the gradation and sediment that each landscape is made up of.

The Flora

The Flora are unlike ones you find naturally. They are cyborgian relatives native only to a digital space. The surfaces of these printed plants range from a silky metallic sheen to soft matte with each component often one solid color. These blooms are the modular component of the 3-legged vessel equation. 3d-printed plastic flowers and plants sprout from the hollow cavities of the "Legs" and tower over the landscape of the "Ground." Designed in parts to optimize printing time and enhance longevity, these plastic flowers were created using the same logic as Tinker Toys or Mr. Potato Head. The petals and leaves are attached to the stems can be connected in multiple different arrangements, as can Mr. Potato Head, where you can change his facial features or swap out one article of clothing for another by simply popping it into the corresponding hole on his potato body. Each stem is modeled to fit a corresponding printed flower frog, which is designed to sit in a designated area on the Ground plane. Organizing these arrangements around a central stem is based on the system of "shin-no-hana"¹⁰, from Japanese meaning "central flower arrangement". In this system, a large branch stands in the middle with three to five seasonal flowers or leaves placed around it. These arrangements are typically symmetrical. However, my iterations of faux flora differ as they create artificial asymmetrical curves.

The Flora not only provides a sense of life and movement to the overall composition and ecosystem of the 3-legged vessels, but it also creates a scale shift. The Flora is scaled to a similar size to flowers as we know them in bouquets. They sprout from the surface of The Ground, which in itself is its own landscape. In comparison to

The Ground plane, these faux flowers are larger than life that add to their already other worldly disposition. There is this continual shift created once the Flora is put into place on the vessel, it cycles back and fourth between being a table top pottery object to an expansive other worldly terrain.

Memory Palace Vessel



"Memory palace vessel in Gentle Mist" 2021 photo by Joe Kramm

A memory palace is a type of mnemonic device which uses visualizations of familiar landscapes or spatial environments in order to enhance the recall of information. It can be a real environment that you have physically or digitally been to, or

it can be an imaginary space in your mind. The memory palace vessel series was started with the idea of creating these future- forms that hold ideas or memories of the past.

Memory palace vessels start off with the ground plane, curves and soft lines joining together to create a nondescript shape from a bird's eye view. Building up from the ground a hollow vessel form stretches and sways to the right or the left. The swell of the hollow form can range from being quiet and soft to quick and sharp. From the hollow form grows facades that stick straight out which cuts the space around the entire vessel, creating two distinct sides to the form. These facades might sprout other facades that curve or run at angles. These facades are generally soft and round, they gently roll into each other. Together these forms allude to a mountain range, a rice terrace or rolling hills, all from a distance.

The 3D printed colored porcelain coils wrap around, building on top of each other to create the vessel in its entirety, but form is not the only thing that is brought into reality. The way the colored porcelain is laid down, row by row, creates an atmosphere. These hazy gradients, bespeckled with glassy colored glaze grog, echo the light of the setting sun cast onto the memory palace landscapes. The atmosphere created gives the viewer a sense that these terrains are far away to be viewed only at a distance. Glaze gloops that are meticulously placed at the summit of the landscapes drip down creating liquid landslides of metallic ooze that brings a sense of gravity and decadence to the memory palace ecosystem.

Front & Front

The memory palace vessel has two distinct sides to them. These sides are created by printed slabs that stretch out from the hollow form at the heart of the vessel. The edges of these flat facades frame the vessel, creating what I like to think of as a “screen”. Instead of thinking of these screens as a front or a back, I think of them as both being the front side. When looking at the vessel straight on, from either front side, it almost flattens the object to be an image of a landscape that your eye travels around, rather than your physical body traveling through the entirety of the form. The experience is analogous to walking your character through pixelated landscapes of early video game worlds. When you are walking through these digital maps, you are only ever confronted with the front facing exteriors of architecture, flora and various characters. You can never see behind a building or tree, even if your character walks behind it, they simply disappear from your view.

Sticker Vessel

A Sticker vessel shares similar logic with its predecessor, the memory palace vessel. Two unique sides are created by the wings that span from the body of the vessel, creating an asymmetrical composition. Each side is a mirrored image of each other. The body is created from an ellipsis that is extruded to a taper, stopping short of the height of the tallest wing. In some cases, curved arches shield the lower belly



"Sticker Vessel in Space Girl" 2021 photo by Joe Kramm

of the vessel and when the audience shifts their view, they can catch a glimpse behind the curves to see what they are protecting. Printed slab stickers are affixed all over the surface, dancing and floating through the atmosphere created on the body of the vessel. These slab stickers often take the form of squiggles, flowers and ellipses, and on the surface of those stickers are cut out shapes and lines revealing the previous printed layer. They mimic carved woodblocks or linoleum for printing making. These slab stickers placed all around the vessel is a nod to collage¹⁰. The stickers are assemblages of different forms coming together to create a new composition on the vessel's surface.

¹⁰ Paper craft that is made by assembling different cuttings from photos or other papers to create a new image, French origin; "to glue" or "To sticker together"

In the show, these sticker vessels were placed on individual floating shelves at an average eye level. The audience could only view one side of the vessel. Looking straight on these vessels read as image or painting. The painterly marks of the printer and the slab stickers assemblages resemble an abstract painting. In its wake, the printer leaves torn edges, over extruded clay and messy mark making on the printed slabs. After each slab is printed, I attach them to the surface, making my hand present in the work. The composition is predetermined digitally, but there is usually some problem solving that needs to occur physically. The vessels are lined with a dark color, so that from the front view the audience can see just a slight glimpse of the back edge and that is to remind them that they are looking at a hollow form.

Between the Studio and the Household

My memory palace vessels thrive in the liminal spaces between the studio and the household. Within the week of my thesis exhibition closing, my debut solo exhibition, "Memory Palace" at R & Company gallery in New York City will open. This body of work has captured the attention of a diverse audience. It has multiple platforms because of what it isn't — and what it is at the same time. You see what you want to see. A memory palace vessels can convince both the luddite and the technophile, they aren't getting along but I am not kicking them out either. It both challenges and accommodates the idea of pottery. The disregard and inclusion of all spaces, this energy is carried by these objects.

Operating in the decorative, they are works to live with in a domestic space. They lack utility like a character or prop as they generate atmosphere in the realm of gathering. Driven by a value system that incorporates my experience of this world. The world I am building is not singular or exclusive, its holistic and complex. There are no rules about how they land. Dislodging themselves from expectations. They are familiar enough that you can understand what they are but distinct enough to have no idea how they work. It insists you become familiar with that kind of transients. They are retro, elemental and sophisticated.

Bibliography

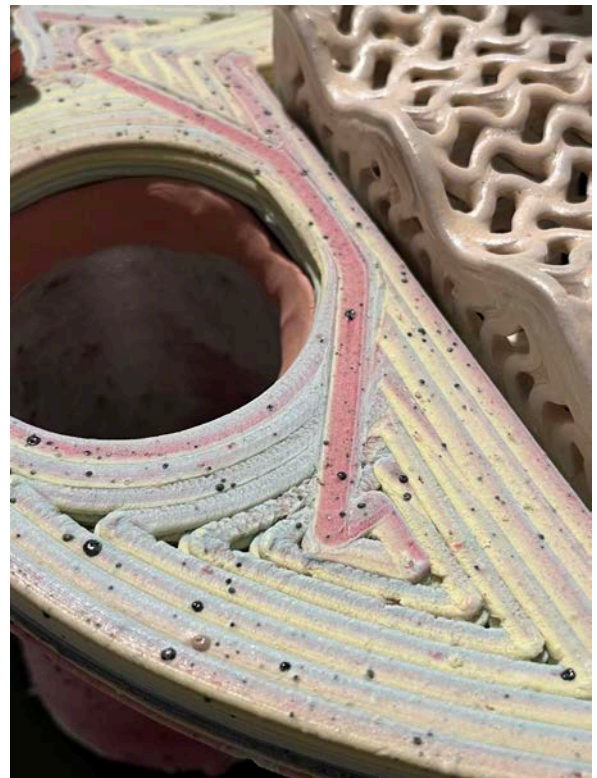
- Chayka, Kyle. "Pokémon and the First Wave of Digital Nostalgia." *The New Yorker*, 3 Dec. 2021, <https://www.newyorker.com/culture/infinite-scroll/pokemon-and-the-first-wave-of-digital-nostalgia>.
- Gaiger, Victoria, and Tom Loxley. *Modern Ikebana: A New Wave in Floral Design*. Ludion, 2020.
- Mars, Roman, and 99Pi. "99% Invisible ." Episode 351: "Play Mountain".
- McCullough, Malcolm. "Hands." *Abstracting Craft: The Practiced Digital Hand*, MIT Press, Cambridge, MA, 1998, pp. 1–29.
- Meier, Allison. "The Evolving Landscapes of Video Games." *Hyperallergic*, 16 Aug. 2013, <https://hyperallergic.com/78850/the-evolving-landscapes-of-video-games/>.
- Noguchi, Isamu, and Fuller. *A Sculptors World*. Steidl Verlag, 2004.
- Satō, Shōzō. *Ikebana: The Art of Arranging Flowers*. Tuttle Publishing, 2013.

Preface to the Technical Statement

My Printer and Me

There is a certain level of skill and movements that are similar in making with your hands, working digitally and video gaming. Your hands are performing sophisticated and unprecedented actions. These motions being quick, small and repetitive, as in much of traditional clay techniques or other hand crafts. Your fingers that once made small repetitive pinching motions when building have now transitioned to making faster and smaller repetitive motions in comparison. Your eyes are no longer on your hands at work, but on the screen, on your printer.

I am using a 3d clay printer as an extension of my physical hands. My digital hand which is guided by my physical hand, creates form in a digital landscape where scale and gravity do not exist. These "obstacles" being removed allows me this ability to play and create freely and quickly. The lack of gravity in that virtual space comes with creating physical glitches in the printing process that I happily welcome in the work. I rarely clean the excess clay coils or other surprises that occur in the print. It feels honest to the process of printing with clay. Trying to remove evidence of the



Unexpected mark-making of the printer's touch



Example of the printer's mark-making

printer's touch reenforces this notion that working digitally has an inherent coldness to it, lacking the warmth that the maker's hands physically brings to the work. It is possible to create a sense of intimacy, sensitivity and tactility in 3d printed ceramics. Bringing the hand back into the process is an integral part of creating that sensibility and so is keeping the integrity of the printer's touch. The printer's touch is not just the mechanical layering

of coils, it is the unexpected movements and over extrusions that produce painterly marks, pushed and ripped clay, and free flowing coils. The removal of those touches is typical amongst today's 3d clay printing artists and designers, creating refined, polished design objects, devoid of the human touch. This way of making is not better or worse than what happens in my studio, it just doesn't feel honest to who I am as a maker.

My printer realizes these hyper pots as physical objects. In a way, it feels like I am working collaboratively with the tool. I have to physically load the tubes with clay and home the z axis manually, I feed the printer the g.code and send it on its way. My printer and I's touch are intertwined. The printer leaving a trail of mark making in its path. I stack and connect prints together leaving finger prints and smudges where printed lines used to be. There is a rhythm present in the dialogue between us, this way of making is not a hands-off experience.

Technical Statement

Material Harmony

Plastic printed "shoes" and flora, brightly tinted epoxy, turned basswood, colored plywood, porcelain, glaze, paint, small metals, plexiglass, resin, magic sculpt, fake flowers, root vegetables and tulips. These materials live in harmony within my practice, there is no hierarchy of material. Some materials, like porcelain or glaze, have reoccurring roles they play, they are not stuck in those roles, they could venture out and be something new. Other non-ceramic materials, play the part of the supporting roles. One can not exist without the other.

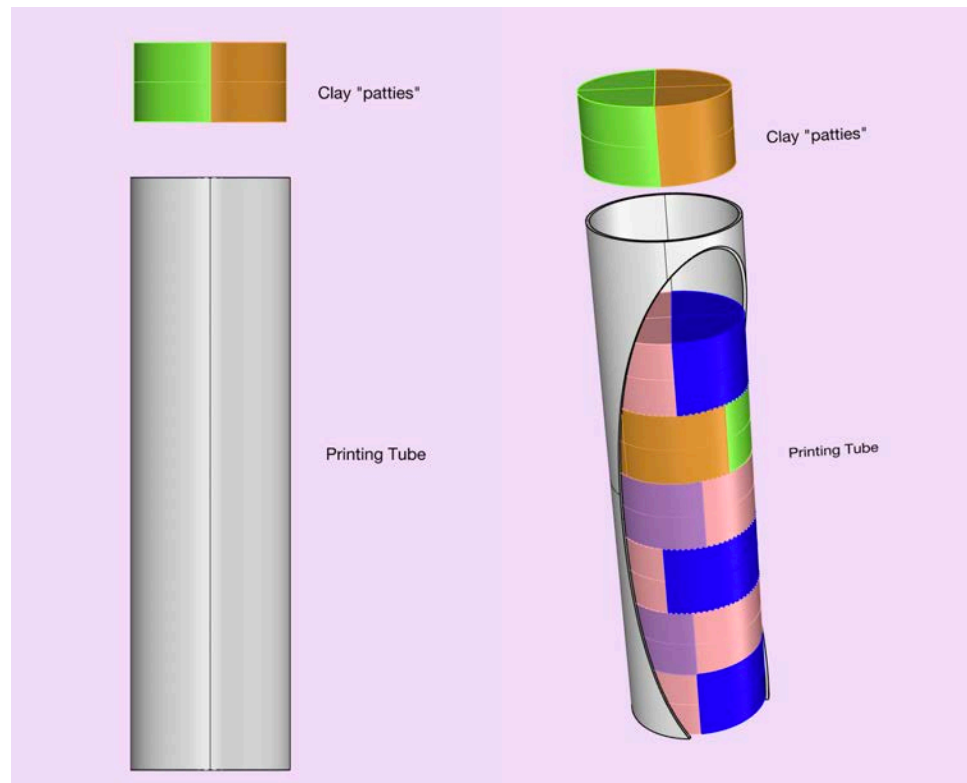
The Colored Porcelain Process

Mostly all of the color in my work comes from the clay body itself. To prepare the colored porcelain, I will first mix 35 pound batches of white porcelain slip using the baby shar mixers in the grinding room, usually mixing about six 5 gallon buckets worth of slip every six weeks. After preparing the slip, in my studio is where I will divide these batches into smaller batches and add the colorants. At this point of the process is where I throw all measurements out the window. I will scoop white porcelain slip into a one gallon bucket and fill that 3/4s of the way. Then I take a bag of whatever mason stain and dump it on the top of the white slip. I measure mason stain with my heart, not a scale. Sometimes I will just use one color stain, or I will use five in one bucket. I am not too concerned about never being able to recreate the same color again, I just sprinkle in the colors, all varying amounts and when I am satisfied, I saturated the pigments with

a small amount of water and blend It all together with my drill. Once the pigments look thoroughly blended, I will add glaze grog or colored grog of a contrasting hue from the clay body itself, and give it another stir. Once I am happy with the color of the slurry and grog content, I then pour the liquid slip into plaster troughs on table right next to the heater in studio. It usually takes about a day to dry to a working consistency.

The Printing Process

Preparing Tubes



Preparing tubes for printing is one of the most loathsome parts of the printing process, but it is where the magic in my work is created. The atmospheric quality that is created on the surface of my vessels is produced by the way I prepare each tube for

printing.¹¹ The image above depicts how I layer colored patties of clay into the printing tube. I take two different colors of clay and smash them together into a round patty, about the size of the plastic tubes opening. The patty is split as close to down the middle as possible, like the example above. You are trying to mimic the frosting pattern on a black and white cookie but with clay. The effect that is created is similar to one of those colored pencils that have multiple colors in one (Koh-i-Noor MAGIC FX Colored Pencil, right). With every directional change your printer makes, the colors will be laid down differently which creates a duo chromatic effect on the surface of whatever you're printing.



Dramatic Overhangs

Dramatic overhangs, swollen rotund vessels and other forms that are not self supporting can cause a lot of issues when printing in clay. In most cases, you can just use an infill in the slicer settings and that will remedy your problem. If you are creating complicated hollow forms, you won't want to use infill, but your form can not support itself — so what should you do?

The solution that I have found that works for me is stuffing the vessel with paper towel as it is being printed. My memory palace vessels all have very dramatic overhangs early on in the print and often can not support themselves. I will take sheets of paper

¹¹ I have only had success doing this method with a Potterbot printer (or any clay printer that uses just a plunger). Any printer that utilizes an auger screw (Lutum Printers) will mix both of the clay colors together sometimes amounting to an unsavory result and diminishing any potential atmosphere.

towel and roll them up into coils and shove them along the inside base of the vessel as it getting built up. After the half way point in the print, you can either stop or continue to fill your form until the print is finished. Something to be cautious about is accidentally bumping the print or moving it out of place in any way because that might result in a “failed” print. When you are ready to load your work into the kiln, you can either remove the paper towel or just burn it out in the kiln. I often do a combination of both, removing as much paper towel as I can so I can reuse them for future prints.

The Firing & Glazing Process

Hot Bisque & Low Glaze

When working with colored porcelain, instead of bisquing my work to a lower temperature, I just take it up to cone 10 on the first firing. I do this because the stains in my clay body become vibrant at the temperature. I don’t glaze that high, I find that the glaze moves the clay around too much at that temperature. After the initial firing, I usually do two to three glaze firings at lower temperatures. My glaze sweet spot is at cone 03 (see recipes below).

Applying glaze to a vitrified body can be challenging, but do you want small wins or big wins? Easy glaze application is a small win. Applying glaze to an already vitrified body requires patience, but it is worth it. Having a heat gun near by is an absolute must when applying your glaze. You need to slowly build up each layer and wait for every layer to dry before you apply the next. You can speed up the process by

using a hair dryer or heat gun. I often try and glaze the work while its still warm from its first firing. Glazing in this way also prevents warping my work.

Kelly's Lo-fire Shino flesh, my most used glaze, reacts in a special way when applied to an already vitrified body. The lithium carbonate does not get absorbed into the porous clay body and just sits on top of it. This creates a mother of pearl/oil spill like reflection on the surface of an already dramatic and atmospheric glaze. It is an 04 glaze, but I think it shines when fired a little bit hotter at cone 03.

Glaze Grog

3d printed ceramic objects always have felt challenging to glaze. I was frequently concerned about compromising the visible layers that make up the surface of my objects. I felt like glaze would hide the artifact of the printer, and then what would even be the point of 3d printing the object if you're just going to cover up those strata? So I landed on this idea of glaze grog, a material that I saw being used frequently in the Grinding room's microbrew clay bodies, I thought it could be a partial solution for my glazing woos.

To make glaze grog (see recipe below), you want to mix up all of your dry ingredients and add enough water to turn it into a paste (you could add more if you want, but it will take longer to dry). Once you have the glaze paste, pour/spread it out onto a plaster bat to dry out. When the glaze brick is fully dry, load it into the kiln with a generous amount of sand underneath of it. Fire your glaze bricks up to cone 01 or 1. You do not want to fire them to a lower temperature than that because they will be too

chalky and turn into dust when you turn it into grog. Make an appointment in the grinding room to use the hammer mill and jaw crusher and make your glaze grog whatever mesh you would like. If you are printing a clay body with glaze grog in it, make sure that the size of the grog is smaller than your nozzle or you will have problems printing.

On Shoes

Trying to find solution to the foot of a clay 3d printed vessel created this lingering feeling that I had been unable to fully resolve my work. During the first two years of my clay printing practice, the work always would sit flush to the table, I would never intervene or engage with the foot of my vessels after being printed. It was what it was because I did not ever want to risk disrupting the form in its greenware state. I would sloppily scrawl my name on the bottom after being fired, but that solution did not feel authentic to my practice.

The Shoe, a 3d plastic printed platform that gets epoxied onto the foot of my vessels post-firing. I have gone through many iterations of these shoes, I always tend to change them when I am making a new vessel form. The main attributes that are constant are my signature that is printed within the confines of the shoe and pegs that help float the vessel above the surface. The color of the plastic usually is a vibrant contrasting color to the colors that are present on the vessel it is being attached to. I had originally come to this solution because I have always admired how Ron Nagle's work sometimes have these small colored platforms that are out of sight to the viewer,

and radiates the color onto the surface which the work is place on. It gives this affect of making the work appearing to just be floating above the surface, leaving a colorful glow in its tracks.

Recipes:

Printing Porcelain $\Delta 10$

Grolleg — 50

Custer — 25

Silica — 25

Bentolite — 2

Veegum — 2

Stain — What ever your heart desires

Glaze Grog Recipe $\Delta 6$ *(See "glaze grog" section for instructions)*

Minspar 200 — 86.5

Ferro Frit 3195 — 4.5

Veegum — 9

Stain — 7

Kelly's Lo-Fire Shino Flesh $\Delta 04$ *Looks best at a HOT Cone 03 over a vitrified light clay body*

Nepheline Syenite — 70

Lithium Carbonate — 29

EPK — 11

Light Rutile — 6

Manganese Carbonate* — 0.05

Sub for copper carbonate for icy blue, cobalt carbonate for deep blue, chrome ox for chartreuse

Pcough low fire gloop $\Delta 03$ (hold for 5-10 mins for drips)

Ferro Frit 3134 — 40

Silica — 40

EPK — 20

Stain - 2

Hardware: Potterbot 9, VormVrij LUTUM clay printer, Prusa i3 MSK+, Nintendo Switch Lite

Software: Rhinoceros 3D 6, Prusa Slicer, Cura Ultimaker Slicer, Adobe Illustrator, Adobe Photoshop, Animal Crossing New Horizons, Stardew Valley

Other Materials: Prusament PLA & PETG (My favorite and most used filament for plastic printing), Geeetech Silk PLA filament, PC 11 epoxy, Magic Sculpt, Powder pigments (for epoxy), Clear Epoxy Resin