



Building a Digital Gallery

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Building a Digital Gallery

By

David Rosenwasser

Bachelor of Architecture, Cornell University, 2018

Submitted in partial fulfillment of the requirements for the degree of

**Master in Design Studies
Technology**

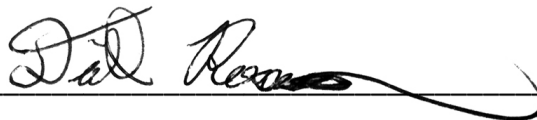
At the Harvard University Graduate School of Design

May, 2021

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Signature of the Author



David Rosenwasser

Harvard University Graduate School of Design

Certified by



Jacob Reidel

Assistant Professor in Practice of Architecture
Harvard University Graduate School of Design

David Rosenwasser

Advised by, Jacob Reidel

Building a Digital Gallery

This project works toward building a technology platform, community, and database for designers and design enthusiasts. The subject matter is furniture, both innovative (new) designer works and iconic (vintage) classics of 20th century design.

The platform seeks to engage 3D scanning, videography, and high-resolution photography to challenge the current standards for viewing furniture and designed objects online today. Creating an immersive digital gallery experience is a notable objective. To initiate this, a collection of iconic furniture was 3D-scanned and hosted digitally, allowing for an intimate experience of the object's details and imperfections.

To build community and trust, the project engages an editorial voice and robust historical dialogue. This includes short essays on important designers and iconic furniture pieces. It also intertwines opinion pieces and critical viewpoints within the online experience. Curation and the subject of authenticity both play crucial roles. Curation requires explicit knowledge of the relationships between varying design pieces in their date of production, material, and design ethos. Showcasing the criteria for authenticity and verifying them builds trust and value for users.

Lastly, the project places considerable emphasis on researching the state-of-the-art in e-commerce, web development, advertising, visualization technologies, online surveying, and 3D scanning hardware. These fields and their complex networks become interdependent for this buildout of a digital platform intended for community-use.

The project works alongside the thesis trajectory of Jeremy Bilotti, SMArchS Computation & MS in Computer Science candidate, MIT. Jeremy has been a collaborator in producing much of the work contained in this dissertation.

Special thanks to Jeremy Bilotti, Bruno Andrews, Robert High, Jacob Reidel, Elisa Medina, Eli Robbins, and Jenny Sabin. The content in this dissertation is courtesy of David Rosenwasser, D ROSE MOD, Jeremy Bilotti, and/or Rarify.

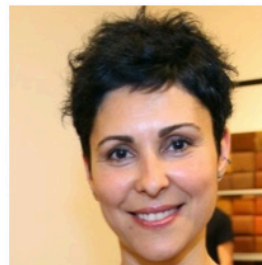
Thesis Panel



Jeremy Bilotti
MIT | Collaborator



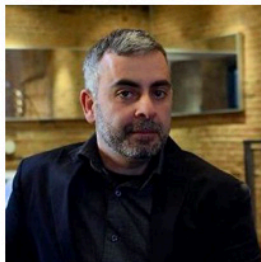
Jacob Reidel
Advisor | GSD Faculty



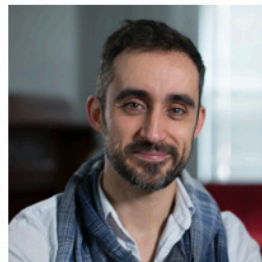
Alev Oztas
President | Emeco



John Edelman
Former CEO | DWR



Allen Sayegh
M.Des Area Head



Jose Luis García
del Castillo y López
M.Des Area Head

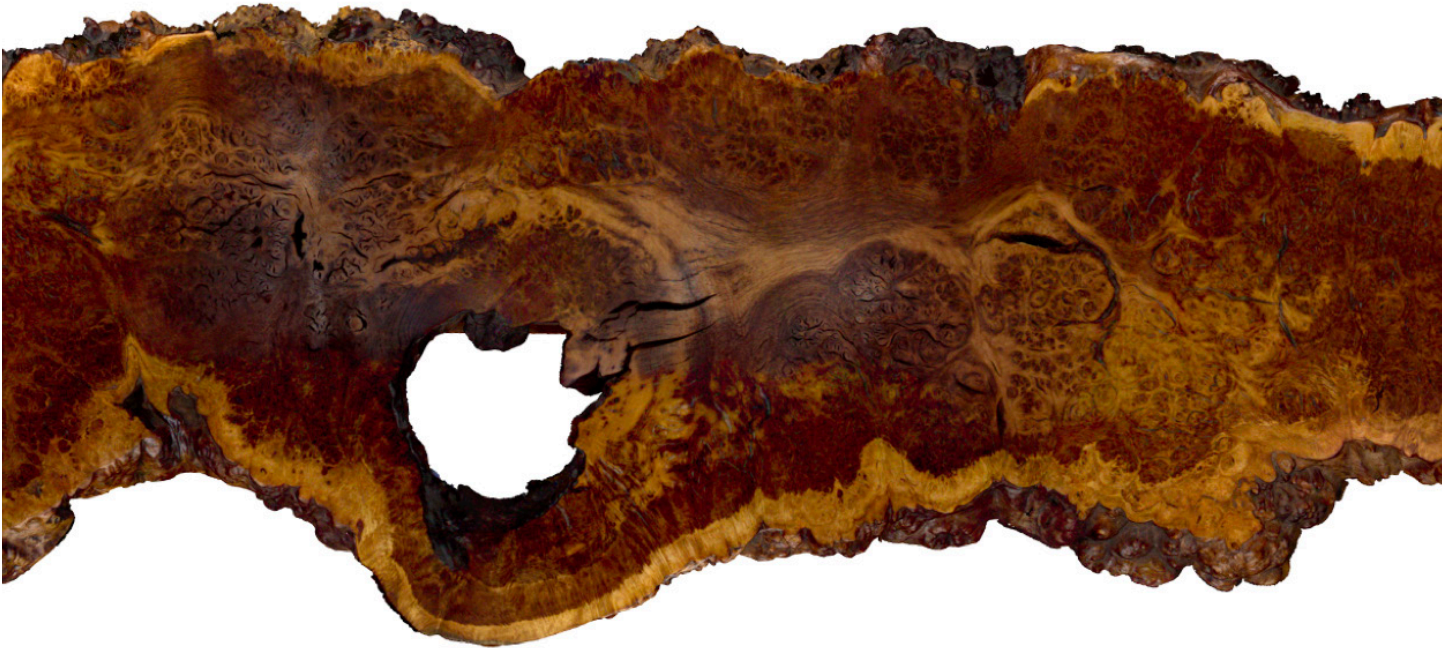


Gregg Buchbinder
CEO | Emeco



Gihan
Amarasiriwardena
Co-Founder
Ministry of Supply

A Thesis?



How does something become a thesis... a brand... a company... a research project... a passion project? This thesis, otherwise called Rarify, is an exploration of how a thesis project can be all of the above with rigor.

Rarify is a passion project, which works toward building a technology platform, community, and database for designers and design enthusiasts. It is not only a business or website, as it engages a vast array of nuanced fields to bring Rarify to fruition.

The subject matter within Rarify is broken down into three categories. There is a collection of rare and sought after vintage designer furniture, a similar offering of used and more recent production iconic designer furnishings, and lastly is a catalog of brand new pieces, which are in partnership with the manufacturers. In order to respect and give proper credit to each category, the history of design and architecture become crucial to putting these works into context. To understand the level of authenticity or the importance of a particular piece, one must know how the individual object relates to all other examples. Curation plays a critical role in identifying what lands on the website and what is omitted from the offerings based on pre-determined criteria. Each piece must be considered as it relates to the rest before it is acquired. Does a chair built into a diverse offering or does it fit a need in a well represented grouping? Do we have too many Le Corbusier LC1 Basculant chairs or is this a great opportunity to add a vintage canvas example to the inventory. Once acquired, each piece needs to be researched further to determine the dates of production, quality/condition of materials, and whether any repairs or restoration are needed. From that point, photography is taken, which must show blemishes and clues, color and artfulness. A piece of furniture must be documented beautifully and honestly to be appreciated in a digital environment.

In the context of representation, the COVID pandemic has left us spending far more time in our homes and on our computers. To see and understand furniture design, places like showrooms, galleries, and museums have historically been the venues to appreciate these works. Even before the

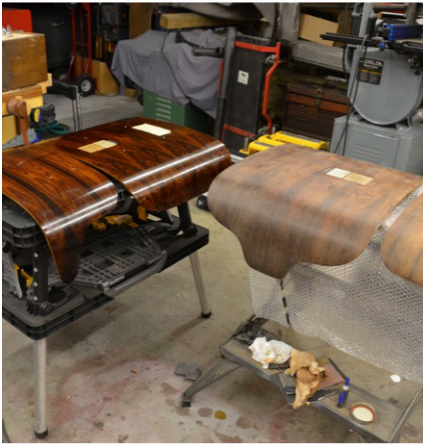
pandemic, however, showrooms and retail stores have been waning as people look and buy online. The online experience for designer furniture, however, has been long ignored in the realm of 3D visualizations and delivery of immersive content. A handful of photos is not always adequate to digest and appreciate a unique or museum-grade piece. We are driven to innovate in this space, helping to lift the standard for resolution, detail, and 3D experience of new and vintage furniture. Photography and videography will be parts of this experience, though we are working to add a 3D-scanned method for visualization and the possibility for augmented reality within Rarify's platform. At the present, we are collaborating with a company that creates 3D scanners to build this resource and troubleshoot the scanning process. Our hope is that we can create digital resources that show designer furniture in unprecedented detail and can communicate as much or close-to as seeing it in-person. We hope to create an immersive digital gallery.

Entrepreneurship today is increasingly reliant on data science and technology at large. Rarify is finding this to be especially true as our digital presence is constructed, as we integrate inventory from multiple sources, and as we collaborate with clients or manufacturers. E-commerce is an art and craft more than a means to an end. To develop an understanding of how visitors want to use Rarify, we conducted surveys with consultation from MIT's survey office. In order to target an audience for the survey, we extensively sorted through existing user data, eventually reaching out to over 1000 users. From their responses, we were able to tune the buildout of the website to respond to pain points and feedback. When populating Rarify with products, we needed to create a backend data structure, which was simple but effective. Rarify leverages third-party apps along with bespoke functionality to pull data and product information from external platforms to Rarify, allowing for constant communication and updates, and allowing inventory management to be more streamlined.

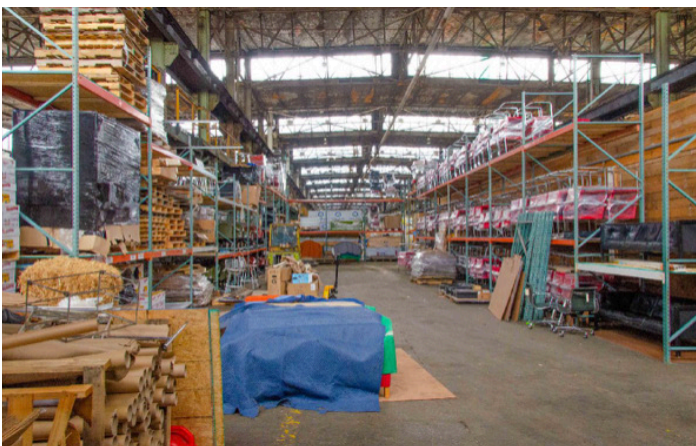
One layer further behind the scenes of this narrative are the people, products, and services that are constantly in flux to keep Rarify's infrastructure moving. When it comes to our vintage offerings, any future sales will depend on our partner's warehouse in Pennsylvania to pull the exact inventory, clean and inspect each product, note any special requests from the customers, and choreograph shipping arrangements either with our existing shipping partners who handle professional packing and shipping with standard carriers and freight, or with our network of independent blanket wrappers. Notice must be given to our the warehouse in Pennsylvania, then handed off in a timely manner to either shipping partner. All of this happens only once a sale has been made. Before this point, products needed to be sourced and vetted, repaired and/or restored when appropriate, documented and listed, with in-house customer support supporting the last part of the process until the products are delivered and safe in their new homes.

In dealing with new products and design brands/manufacturers, we have the benefit of long term relationships with the products, however, the documentation of work and the brand itself becomes arguably more complex than vintage pieces, as the design brand needs to be represented as it relates to its products, involving the ethos and history of the company itself in addition to the designers and history of the product. This means that travel and/or borrowing products from the manufacturer become important, requiring trips out to factories, extra time for 3D scanning, and beyond.

Lastly, community does and will play an enormous role in how the company grows, adapts, and matures. In addition to showcasing noteworthy collections of designer furniture, we also aim to foster a community around the work we're doing. The existence of an archive on the website and well-documented content will be one piece of this, however, an active blog along with social media presence will be essential to keeping users engaged. As our day to day operations involve new works coming in, restoration taking place, and creating documentation, we hope to use these processes as opportunities to share with others and create an educational platform that others can be a part of.



To provide some background, I started collecting and restoring vintage designer furniture as a high school student, spending my time flipping and hustling chairs from Craigslist onto eBay and stockpiling it at the architect's office I used to intern at. This soon became over 100 pieces from rosewood eames lounges to Florence Knoll cabinets and beyond, all of which I was obsessively learning about and meticulously restoring myself. Each nut and bolt became intimately familiar.



Fast forward to today, I own and operate D ROSE MOD, which has matured to 30,000 square feet of warehouse space and 3,000+ pieces of high end and collectible vintage furniture.



This is what much of the operation looks like today, in the former Bethlehem Steel Railroad Spike Plant. We've had considerable growth year over year and now have a small team of employees, handling photography, warehouse management, restoration, and shipping.



To more clearly understand the fields we're working within, we arranged critiques... conversations... and interviews with industry experts through the last four months. These are just a few. They range the gamut from notable design and furniture brands to leaders in technology at large, including 3D scanning, successful startups, and advanced research.

Mission



Rarify is a company that cares deeply about important design. We have grown and established our reputation by spending years in the design and architecture community, working hands-on in innovative design offices, research labs, as scholars in design history, and as dealers of sought after 20th century furniture. Our founders carry professional degrees in Architecture, Computer Sciences, Design Studies, and Design Computation. They also carry invaluable yet informal expertise from growing their passions outside of the academic setting. Our company does not aspire to sell products to customers. We instead hope to foster a community, where we can help to facilitate education and exploration of important design works. Rarify aspires to showcase the finest museum-grade examples of rare design for view and for purchase, while carrying authentic new products and vintage that can be afforded by the masses of design lovers across all incomes and interests.

We look up to the foundation laid by Florence and Hans Knoll in particular, along with the influence that brands such as Design Within Reach have had in increasing exposure to the designers and works that we so appreciate. It could be argued that Florence and Hans Knoll were singlehandedly responsible for bringing the international style and modernism to the eyes of millions in the 1940's and beyond. Florence Knoll was prolific in taking her professional expertise in architecture from working with Marcel Breuer, Walter Gropius, and Mies Van Der Rohe, and then translating pressing needs in the architectural world to uncanny success and impact. Through the Knoll Planning Unit, Knoll's interiors division, Florence Knoll would design and deliver new works to complement and create post-war corporate interiors within the US. This included the likes of General Motors, IBM, and CBS, along with the interiors of countless influential architects of the mid 20th century. Florence would bring established and untested designers to the Knoll company to produce new works, seek out existing designs from those such as Mies Van Der Rohe to produce through Knoll at scale, and when other designs were needed still, she would create the "meat and potatoes" herself. Those "fill-in" furnishings often included less-desirable products such as sofas and credenzas that other designers did not take interest in, however, her expansive catalog of works have now become as recognized or more than Knoll's icons by other designers.

Thanks to the Knoll's impact across corporate America and innovation from the Eames, George Nelson, and others, a renaissance of design took place during this period that led to excitement and education about what modernism looks like. While modern design was visible in magazines, tele-

vision, and to clients who could afford and find architects/designers, it was not widely available for sale across the US and international marketplace. Fast forward to 1999 and we saw the introduction of Design Within Reach (DWR), a company that was not monetarily within reach, but instead made iconic designs of the 20th century accessible to the public for purchase. Through their showrooms, catalogs, and online presence, design was finally easy to buy and frequently in stock. Until 2010, however, the company was cursed through choosing to carry some unlicensed products along with licensed counterparts, while facing financial losses from rapid growth of showrooms. John Edelman was instrumental in changing DWR's fate, bringing his industry expertise and passion for authentic design to the company. Today, Design Within Reach is under the ownership of Herman Miller.

So what's the problem? Why does Rarify need to exist? The design renaissance of the mid 20th century happened because furniture and design objects had not yet been created to accompany the increasingly modern world. Today, we face a different challenge. Many facets of life have moved into a digital space, making the once-novel idea of a showroom less and less relevant. As we have become comfortable buying furniture online, we want an experience that is as immersive as being in the showroom itself. Instead, what we have available to us for new furniture online is an unfiltered and often chaotic offering of every new product that every design brand produces. Combine this with hundreds of material options and we already have a headache. In the realm of vintage, private equity groups are now guiding the future of vintage marketplaces, distilling what may have been special in exchange for higher earnings. In those cases, authenticity is rarely vetted and quality is rapidly descending. Where can you go to buy curated authentic designs that are both new and vintage? You can't.

Rarify needs to exist because authentic designs need to be visible and profound to look at online, with a community around them. With our backgrounds in technology, we will bring 3D scanning and ultra-high resolution photography to the table, helping to build an archive, online museum, and marketplace. Rarify aspires to be rigorous in its curation, but not glamorous. With your help, we want to create a resource that is educational and useful, while introducing a digital showroom that is enjoyable to browse or buy from. We are passionate about design and feel that enthusiasts and designers alike deserve an inviting place to engage their passions.



Why 3D Scanning?



What's so cool about 3D scanning and why does it matter for the design world and for furniture?

We've got a number of answers for you. Documentation and visualization are huge parts of making a digital experience special. They are also primary tools for informing someone about a piece of furniture and sharing the condition, material qualities, shape, and size. As of the past one to two decades, the breakdown has been something like this: 1) Furniture brands use photographs and renderings to show their designs and typically do this with limited stock photos. 2) Used and vintage online retailers show photos of the exact object but rarely are they photographed professionally and often the presentation is lacking in curation. 3) Auction houses photograph the exact pieces, but share very few photos.

The main issue is that when buying new or vintage designer furniture online, there is often missing information and it becomes difficult to understand the condition of the furniture and/or what the materials are like. With 3D scanning, we have the capability to record the geometry of an object with one-quarter millimeter accuracy (or higher if desired) and have the exact color and material textures shown on the 3D object also. This means that a viewer can rotate around the object to see its size and shape, then have a better understanding of the material also.

How does 3D scanning work? 3D scanning has actually been around since as early as the 1960s in the form of laser scanning, though massive growth in technological advancement has not happened until more recently for academic and commercial usage. The goal of 3D scanning is typically to produce a digital 3D model of an object. It does this by creating a series of points at the locations that it identifies an object. This can be done either through physically touching the object to record the location or if can take place via a light/projection based approach. Common approaches include lasers, which rely on the reflections to identify a location. In our lives today, 3D scanning is playing an increasingly intimate role. Apple's Face ID, introduced in 2017, uses an infrared camera to project invisible dots onto our faces to produce a mesh that needs to match the original scan of our face. As

of 2020, Apple also introduced LiDAR scanners as part of the iPhone 12 Pro's, which help in advancing Animoji's, but also can allow for users to 3D scan objects from their phone. Photogrammetry is a different kind of "3D scanning" method. This instead uses images to extract 3D geometry, often requiring views from multiple angles and directions to produce an accurate model. Google has used photogrammetry to produce 3D maps in Google Maps. Apps like 123D Catch (no longer available as of 2017) were available as early as 2009, allowing you to create a 3D scan from an iPhone much earlier on.

The cutting edge in 3D scanning, however, has often come with an unbelievable cost. Only a couple of years ago, a professional 3D scanner for furniture or similarly sized objects would have cost \$60,000-\$100,000. Today, those numbers have changed considerably, while the functionality of software and capabilities of the hardware have been continuing to improve rapidly. One of the scanners that we use at Rarify is a handheld structured light scanner, which projects white light with a pattern on it to pick up and identify the location of what we are scanning. It simultaneously has a camera that is capturing the colors and textures of the object. Some of the challenges that exist for furniture include time and materials. While some pieces with unique textures and geometry can be scanned quickly, others with more consistent materials and sharper forms can take hours to scan. A typical structured light scanner using white light has great difficulty with dark or black objects, shiny surfaces, and transparent materials such as glass. While there are ways around this and other equipment better suited for the job, this continues to be a difficult territory for 3D scanning today.

As we move forward, the barrier to entry for 3D scanning will continue to get lower and lower. It would be reasonable to imagine that most smartphone users may have high resolution 3D scanning capabilities on their phones in the next two to four years. For the world of architecture, design, and interiors, this may forever change how consumers interact with objects and designers. It will also make for new experiences in augmented and virtual reality.



Ray and Charles Eames



The Eames' are two of the most prolific figures in 20th century design and architecture. Ray and Charles were partners in life through marriage and in work through the Eames Office. As was often the case for women in the mid 20th century, Ray was often overlooked and not given proper credit for her impacts within the Eames Office, though many voices who worked for the Eames Office make clear that she played as great a role in design as Charles. Labels from Herman Miller in the 1950s and 1960s state "Designed by Charles Eames," overshadowing both Ray and the designers who were so impactful within the Eames Office otherwise at that time.

Ray Kaiser Eames was born in Sacramento and left to New York after high school to study abstract expressionist painting under the influential Hans Hoffman. After establishing herself there, she left to Cranbrook Academy of Art in 1940, where she continued her studies and would collaborate with Harry Bertoia, Eero Saarinen, and Charles Eames for Organic Design in Home Furnishings exhibition for the Museum of Modern Art. Ray married Charles in 1941 and soon after moved to Los Angeles, where the couple would begin working on the design for their home as part of the Case Study House program, sponsored by John Entenza for Arts & Architecture magazine. Alongside countless furniture collaborations within the Eames office, Ray's most distinct attributions fall in the realm of graphic design, textile design, collage, and plywood design. Ray designed over two dozen covers for the influential Arts and Architecture magazine, which have become icons in themselves graphically. Her experience in fashion also lent itself to working on the Eames leg splint, designed for the US military between 1941 and 1942, along with sculptures and prototypes in plywood such as those in the permanent collection of the MOMA.

Charles Eames was born in St. Louis and studied architecture at Washington University in St. Louis. It is said that Charles' views often clashed with his professors, as he advocated for modern design and for pioneers such as Frank Lloyd Wright. During much of the 1930s, Charles and two partners

ran an architectural practice, though his modern architectural moves were notably subtle during this phase. He moved to study architecture at Cranbrook in 1938, where he would collaborate with Eero Saarinen, learn from Eliel Saarinen, and meet Ray Kaiser. Whereas Ray was more known independently for her textiles and graphic works, Charles was often known for furniture, photography, and videography. He was certainly the more prominent show person and was often playing a lead role in presenting the work and discussing it in TV and beyond. In reality, we understand that Charles and Ray worked in a highly collaborative way, alongside the Eames office at large.

Between the early 1940s and time of Ray's passing in 1988, the Eames Office produced an overwhelming number of furnishings, graphics, films, exhibitions, toys, buildings, and interiors. In the mid 1940s, their molded plywood furniture emerged from experiments with the Eames leg splint. The LCW (lounge chair molded) was called "the chair of the century" by Time magazine. During the late 1940s and early 1950s, the Eames fiberglass chairs were introduced for Herman Miller. Apart from being collected across numerous museums, the chairs became ubiquitous around the US and the world for their durability, range of colors, and mass affordability. In 1956, the Eames lounge chair and ottoman (670 + 671) were introduced, bringing a luxurious product to an otherwise utilitarian suite of pieces. As we know, this became a coveted pair for just about anyone who appreciated design or could afford one. By 1958, the Aluminum Group was introduced, which used lightweight cast aluminum parts and upholstery to create a strong and elegant office series. Today, the Aluminum Group chairs have become design icons and status symbols across offices and media. They are seemingly timeless and forever modern. The Eames tandem (airport) seating was introduced in 1962 and has since been used in airports internationally. By 1964, IBM world's fair pavilion came to life in collaboration with their friend Eero Saarinen. In 1977, shortly before the passing of Charles, the short film Powers of Ten was introduced, a brilliant example of their design ideology translating to film. Ray continued to work and produce designs after Charles passed, completing the Eames sofa in 1978, which had been developed over many years. The Eames Office still carries onward to this day, helping to document the legacy of Ray and Charles, while also ensuring that their designs are responsibly manufactured and honored.



Florence Knoll



It could be argued that Florence and Hans Knoll were singlehandedly responsible for bringing the international style and modernism to the eyes of millions in the 1940's and beyond. Hans was impactful in running the business, whereas Florence was the design mastermind behind making Knoll one of the leading creators of modern products. Florence Schust was born in Michigan and orphaned at a young age. Her caretaker enrolled her in school within the Cranbrook Academy as part of their boarding school, where she excelled in the arts and was connected with the art academy president Eliel Saarinen. Florence then enrolled in their architecture program, left to study town/urban planning at Columbia University, and came back to study at Cranbrook, where she worked with Charles Eames and Eero Saarinen. Her education continued in London at the Architectural Association, though soon moved back to the US to Cambridge, Massachusetts, where she apprenticed under Walter Gropius and Marcel Breuer. Florence then moved to what is now Illinois Institute of Technology to study under Mies Van Der Rohe, finally receiving her Bachelor of Architecture in 1941. She worked briefly as an architect for Harrison & Abramovitz before joining Hans Knoll's furniture company in 1943.

After jointly forming Knoll Associates with Hans, Florence helped to transform the small company into an immensely influential design brand. Through the Knoll Planning Unit, Knoll's interiors division, Florence Knoll would design and deliver new works to complement and create post-war corporate interiors within the US. This included the likes of General Motors, IBM, and CBS, along with the interiors of countless influential architects of the mid 20th century. Florence would bring established and untested designers to the Knoll company to produce new works, seek out existing designs from those such as Mies Van Der Rohe to produce through Knoll at scale, and when other designs were needed still, she would create the "meat and potatoes" herself. Those "fill-in" furnishings often included less-desirable products such as sofas and credenzas that other designers did not take interest in, however, her expansive catalog of works have now become as recognized or more than Knoll's icons by other designers.

Early collaborations and designed works for Knoll included the likes of Jens Risom, who created a number of iconic wooden chairs with webbing and upholstery, along with organically-shaped tables. Florence brought on friends such as Eero Saarinen and the sculptor Harry Bertoia to create pieces such as the Womb Chair and iconic wire chairs. Isamu Noguchi would design the cyclone table and a lamp for Knoll, while George Nakashima was brought in early in his career to create a small series of wooden chairs and tables. Into the 1960s, Richard Schultz and Warren Platner worked with Knoll to create the 1966 Collection of outdoor furniture and the Platner series of wire furniture. Ten years after Hans Knoll's sudden death in 1955, Florence sold the companies after again growing Knoll under her leadership. For the remainder of the 20th century and up until today, Knoll continues to lead in design, with collaborations from world-class designers and with broad impacts across offices and homes.

A photograph of a cardboard box with a red and yellow label. The label is rectangular and features the text "KNOLL ASSOCIATES INC." in bold, black, sans-serif capital letters on a red background. Below this, on a yellow background, is the address "601 MADISON AVENUE, NEW YORK 22, N. Y." in bold, black, sans-serif capital letters. The box is made of brown cardboard and has a horizontal crease near the top.

KNOLL ASSOCIATES INC.
601 MADISON AVENUE, NEW YORK 22, N. Y.

Eero Saarinen



Eero Saarinen was a renowned architect and industrial designer, who helped to craft the aesthetic of 20th century modern life. Eero Saarinen was born and raised first in Finland then in Michigan. His father was the architect and designer Eliel Saarinen, who led Cranbrook's Academy of Art and who also made a name for himself as a leading figure in architecture during the Art Nouveau period. Eero studied sculpture in Paris and architecture later at Yale. After returning to Cranbrook to work for his father's firm and teach in the mid 1930s, Saarinen worked closely with Charles Eames, Ray Kaiser (Eames), Harry Bertoia, and Florence Schust (Knoll). He and Charles Eames were recognized in 1940 for a chair design that they submitted to the Museum of Modern Art's Organic Design in Home Furnishings competition, where they received first prize. Eero would soon continue this line of work for an exhibition at the MOMA. While Florence and Hans Knoll were building their company, Eero was asked to design a number of works for them, including the Womb chair, Tulip series, Grasshopper chair, among others. In 1948, Eero was chosen to design the St. Louis Gateway Arch, which was eventually completed in 1965. Having designed so many recognizable pieces of furniture quite early in his career, Saarinen went on to design a considerable number of iconic architectural works. This includes the TWA Terminal at JFK Airport, the chapel and Kresge Auditorium at MIT, along with more than 50 other buildings. Eero Saarinen died in 1961 at the age of 51, helping to highlight the extraordinary nature of his accomplishments during that time.

As it relates to Saarinen's furniture designs, many are still produced to this day by the Knoll company. Whereas the Grasshopper chair and ottoman were not huge commercial successes, his upholstered executive seating, tulip tables, womb chair, and others are still found today in offices, noteworthy homes, and are specified by designers due to their visual simplicity and use of material. Many of his chairs take on upholstery brilliantly and were used to showcase some of Knoll's highly textured and brightly colored textiles. The Tulip tables are made in laminate, stone, and wood, often giving the tops an appearance of levitation, with support from cast iron and cast aluminum (depending on the era). Early Saarinen pieces have a notable patina that differentiate them from new production works, as white tulip bases take on a darker hue for instance and the seating with original upholstery can often be strikingly attributed to the period of production. In contrast, new Saarinen designs for Knoll are still made with the same quality and attention to detail as the early examples, while providing a crisp and polished finish, especially with the marble tables.

Harry Bertoia



Harry Bertoia was born in Italy, however, like many of his colleagues, ended up living in Michigan and studying at Cranbrook's Academy of Art. Having excelled in jewelry making and design, Bertoia was given a scholarship to attend Cranbrook, where he met Ray Kaiser (Eames), Charles Eames, Eero Saarinen, and Florence Schust (Knoll), and Walter Gropius. After teaching at Cranbrook, Bertoia worked for Ray and Charles Eames at the Evans Products manufacturing company, where early examples of Eames plywood furniture was just emerging. In 1950, Bertoia was invited by Florence and Hans Knoll to come work as a designer with them in Pennsylvania and to design some production furniture pieces. He was given a space to prototype and work. This time in Pennsylvania led to the birth of the Bertoia wire collection, including side chairs and the diamond chair. Upholstery of varying scales and functions was designed for each of these pieces as well, helping to hide or expose the wire framework accordingly. The chairs were very successful and thanks to Florence Knoll's advocacy for designers, Bertoia received appropriate compensation for his work. The chairs were such a success that he was able to devote his life and work exclusively to sculpture from the mid 1950s forward. During this time, he worked on a number of public sculpture projects and also produced the Sonambient sculptures, which are highly sought after today. Thanks to some of the connections formed at Knoll and Cranbrook, many of the designers remained friends for decades onward. The studio of George Nakashima and now Mira maintains a small collection of Bertoia sculptures. Similarly, Eero Saarinen chose to collaborate with Bertoia in creating a sculpture for the MIT Chapel that Saarinen designed. Today, Harry's son Val is producing sculptural work to carry on his father's legacy. The iconic chairs are still being produced by Knoll.

Somewhat different from the work Florence Knoll, Ray and Charles Eames, and Eero Saarinen, Harry Bertoia had designed a more limited collection of furniture pieces, which has generally remained in production with only subtle changes over the close to seven decades since. While some older Bertoia chairs do suffer from small breaks in the wire much like the Eames wire chairs (often they will need to

be spot welded again), the furniture often remains pleasantly intact. Vintage examples can be powder coated for greater protection and sandblasted if they need the original finish to be stripped. The upholstery on older Bertoia pieces is often torn or in need of replacing, as decades-old foam has a tendency to become crunchy and eventually turn to dust. Knoll's brand new Bertoia pieces are also made with the same quality and attention to detail as the originals, arguably with improved or longer lasting finishes. The vintage slatted Bertoia benches are somewhat rare and shockingly heavy. They use thicker gauge metal on the legs than the chair's seats and slatted oak in many cases for the bench seat. Early Bertoia child-size chairs are also very collectible and unique. There were multiple sizes produced, which tend to pair well with the Noguchi cyclone child's/side table. The Asymmetric lounge by Bertoia was designed earlier in his life, though was not produced until 2005.



George Nakashima



George Nakashima is widely considered one of the three fathers of modern American woodworking, along with Sam Maloof and Wharton Esherick. Whereas Maloof and Esherick focused to a greater extent on sculpting their forms by hand, George Nakashima took an approach that was in many ways more architectural, natural, and accepting of (some) modern tools. Often making nods to his Japanese-American upbringing in his work, Nakashima had a profoundly spiritual relationship with the work he produced and the material that was used in its construction.

Born in Spokane Washington to Japanese Immigrants, Nakashima went to study architecture at the University of Washington, where he received his B.Arch. Afterwards, he pursued graduate work in architecture at MIT, where he produced meticulous drawings by hand, still on display today at the Nakashima studio. Interested in travel and the work of Le Corbusier, Nakashima bought an around-the-world ticket on a steamship, eventually ending up in Japan to work with Antonin Raymond, a well known protege of Frank Lloyd Wright. This led him to work in India on one of Raymond's projects, overseeing the construction of an Ashram dormitory, while simultaneously immersing himself in spiritual teachings. As World War II came about, Nakashima returned to the US and was soon after placed in an internment camp in Idaho with his newly-wedded wife Marion and daughter Mira. It was at this internment camp where Nakashima met a master carpenter, who he was able to apprentice under and learn the skills of making furniture by hand.

With sponsorship from Antonin Raymond, Nakashima was able to leave the internment camps with his family and move to New Hope, Pennsylvania, where Raymond had a farm and office. Nakashima soon worked in exchange for land and built a small wood shop to work in and eventually a small place to live. Florence and Hans Knoll were building their furniture company and asked Nakashima to design a group of pieces for them in the mid 1940s. He designed the Straight chair (a variation on the Windsor chair), Captain's chair, two coffee tables, and approximately two dining tables. Though

some of the production was outsourced, work was also being produced by Nakashima for Knoll. The royalties from these pieces allowed Nakashima to finally build a more robust shop and start making private commissions at an incrementally larger scale. By the late 1940's, Nakashima was producing studio pieces of his own and building a line that would only be produced in-house. In the late 1950s, George was also approached by the Widdicomb-Mueller company to produce the origins line, which used many of the stylistic queues that Nakashima was known for, though the line was produced by Widdicomb in Grand Rapids and the case goods (cabinets) were made with veneers, as opposed to solid hardwoods. Mira Nakashima has noted that the Widdicomb pieces showcase some of George's experimental and early use of exceptionally figured and burl'd woods, which would later become a noteworthy part of his work late in life.

Following the Origins line and Knoll pieces, George worked exclusively from the New Hope, Pennsylvania studio and had a small team of woodworkers crafting each piece of furniture. Of the studio chairs, the conoid and grass seated chairs have both become highly coveted design icons. Within the realm of tables, George was one of the first to explore free edges on wooden slabs. By using free edges and butterfly wood joints as functional and beautiful details, he felt that he could allow the tree to live a new life. By using simple architectural bases, George would allow the slabs to speak on their own without interruption. Early in his studio work, using uniquely formed or split slabs was a practical matter, as those boards were far less expensive to purchase and less desirable. As his career matured, it was clear that slabs with unique shapes and intriguing figure were desired by his clients. By the end of his life, George was well known in the design community with notable commissions from the Rockefeller's (1973) and other noteworthy names. He amassed a tremendous collection of rare woods and would use species such as English oak burl or Persian walnut in constructing commissioned pieces. George passed away in 1990, leaving the legacy to Mira Nakashima, a trained architect and woodworker, who had worked under him for decades prior. Mira continues to produce exceptional works at the Nakashima Studio.



Mira Nakashima



Mira Nakashima is a world-renowned architect, designer, and furniture maker, who has carried on and built upon the work of her father George Nakashima since his passing in 1990. Mira Nakashima was born in 1942, shortly before her family was put in Japanese internment camps in Idaho during World War II. Having been raised around her father's woodworking studio in New Hope, Mira was exposed to design and craft from a young age. She left to study architecture at Harvard, receiving a Bachelor of Arts and further honing her skills in design. She then continued to graduate work in architecture at Waseda University in Tokyo. Mira returned to New Hope in 1970 to work as an apprentice to her father and as a woodworker. She built her house near the woodworking studio soon after. As Mira worked with her father, she learned the nuances of crafting architectural drawings of the furniture pieces, understanding each slab to know what they could become, and seeing through the process of crafting and finishing. At the time of George's passing in 1990, Mira had already been working with George for two decades. Since then, she has continued to push the work of her father beyond his bounds, producing works with the same meticulous attention to detail and craft, while using a subtly different palate of materials and creating new lines of work, which nod to her father's. To this day, the Nakashima Studio in New Hope is an astonishing place filled with talent and rare hardwoods. The buildings on-site were constructed iteratively since the 1940s and each tell their own story from the showroom to museum and barn. The campus is in the National Historic Registry.

Of the pieces crafted under Mira Nakashima's leadership, the design language has remained consistent from her father's, though the approach to each piece and slab takes on new meaning. Mira takes on a more experimental approach to exotic materials and familiar ones, using a wider range of burls and figured domestic hardwoods. Similarly, her pieces tend to engage contrast between base and slab more expressively than her father's work. Whereas so much of George's early work was restrained and limited generally to straight-grained walnut for the late 1940s and much of the 1950s, the recognition of Nakashima Studio work has also allowed Mira to work more creatively, while still following the Nakashima's design language. Mira has taken part in a number of exhibitions during over the past three decades, which have led to new collections of works as well. This included a 2001 exhibition hosted by Philadelphia's Moderne Gallery and another in 2013 called "An Evolving Legacy." Most recently, Mira completed an architectural-scale project for the Connaught Grill restaurant in London.

Aino and Alvar Aalto



Aino and Alvar Aalto were renowned Finnish architects, industrial designers, craftspeople, and furniture makers. Together with two others, the couple founded the furniture company Artek in 1935. Alvar Aalto considered himself an architect first, with other design typologies falling within the architectural domain. Aino Aalto covered a vast range of materials and design genres, including textiles, glass, furniture, and architecture as well. While Alvar Aalto is often attributed (perhaps misattributed) to most of the furniture works by Artek on the market, it is worth noting that Aino was head designer at Artek, before she eventually became managing director. Artek still exists today and produces works by both Aino and Alvar Aalto.

Some of Aino's most known independent pieces include a glassware set that was designed for the Finnish glass company Iittala, along with a Child's chair (model 103) produced by Artek, both of which can be found in the permanent collection of the Museum of Modern Art. Aino worked on a number of collaborations with her husband Alvar as well, including works of architecture and the now iconic Savoy vase. Between the 1920s and 1930s, Aino and Alvar worked on furniture pieces in great depth and explored some of their bent plywood forms. In designing the Paimio Sanatorium, the interiors and furnishings were part of the scope (via the concept of a total work of art or *Gesamtkunstwerk*). Aino took a leading role in the interiors of the building, as she did often prior to her passing. The notable Paimio chair was designed for this project and remains one of the most famous Artek pieces. Aino passed away from cancer in 1949.

Alvar Aalto was an exceptionally productive architect, alongside his work in furniture, lighting, and glassware. He designed some 500 buildings during his life, approximately half of which were designed during Aino's lifetime. Aino and Alvar were known earlier on in their marriage to submit entries to architectural competitions separately, reflecting both of their competencies and confidence. In the architectural domain, the Santa Maria Assunta church in Riola (constructed from 1975-1993) is one of

Alvar Aalto's most stunning and recognizable works. It reflects Alvar's interest in an organic modernism, which differentiated him from architects like Mies Van Der Rohe. The MIT Baker House Dormitory is another terrific and earlier example of Alvar's work. It utilized a sinuous curve in its plan, with a more reserved material palette, fitting for the New England vernacular of the time.

In collecting furniture pieces by Alvar and Aino Aalto, it is worth paying close attention to the approximate dates of production and perhaps more importantly, the patina of each individual piece. Since Artek has been producing Aalto furniture since its inception, it is often difficult to pinpoint exactly when a piece was produced, especially if it lacks a label or a legible marking. From our experience, a considerable amount of information can be gleaned from the condition and vibrance of the wood finish, alongside the wear and use found on upholstered pieces. Newer Artek furniture or those produced since approximately the 1970s carry a brighter appearance to their birch plywood and likely used a different type of finish. Examples made since circa 2002 often retain a more identifiable label stating something like "Original Alvar Aalto Design, Artek, Made in Finland 2002." As is often found with early Knoll pieces, this may in fact be primarily because the stickers are still sticking at this point and have yet to fall off. For a time during the 2000s, Modernica in Los Angeles was also producing some designs made to Aalto's spec, which should be noted when looking for newer examples. Those Modernica examples are unrelated to any Artek works. For examples pre-dating the 1970s and certainly before the 2000s, it is helpful to consider what design is being assessed and whether those designs were widely produced. If it is a more successful or iconic piece such as the 37 400 Tank chair, Paimio chair, or 60 stool, then it may require a more particular assessment, however, some more obscure designs may indeed be easier to identify, as some were not widely produced and may be more generally associated with a specific period.

At the moment that this is being written, we have a set of 8 Aalto 611 stacking chairs, which were produced in 1951 or very close to. We know this because they were purchased new for a house designed by James Speyer and constructed in 1951. Example of the 611 chairs from previous sales typically show 1950s production, thus helping to further assess this model. As a similar example, we also have a 37 400 tank chair and 34 402 lounge chair in-house, which came from the same estate in Vermont as an early Knoll grasshopper chair. Aside from the clear signs of patina, original and torn upholstery, and oxidized hardware that all help to signify a production run, we also knew that these pieces were purchased new from the same owner and that at the very least, the Grasshopper chair was no longer in production by 1965, with that run beginning in 1946. We concluded that based on other examples we were familiar with and based on other provenance from the original owner that the chairs date to the early 1950s. The point of these examples is that Aalto furniture is often imperfect in its preservation of details and is not as well documented or consistent as Eames furniture by Herman Miller with dates and patent numbers being so trackable in their case. A nuanced eye and investigation is often required to identify year and model number, which can be further aided with books published on Aalto's furniture for instance. Lastly, keep an eye out for markings that say Finsven, Finmar, or Artek. All of those markings were used on early Aalto pieces and can help to further identify your piece.

Richard Schultz

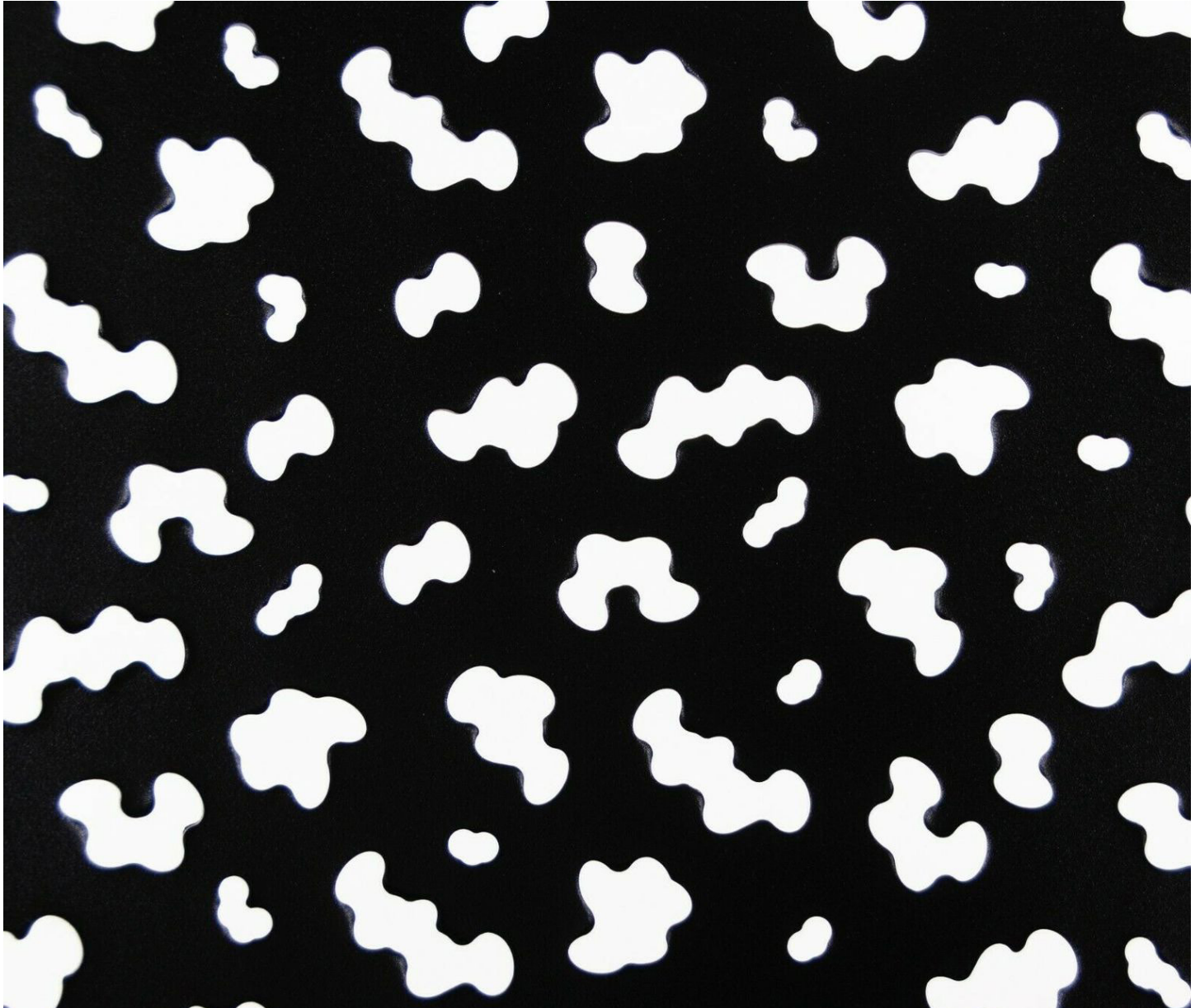


Richard Schultz is a furniture designer known for his influence on outdoor furniture from the 1950s to today. Through both Knoll and his own brand, Richard Schultz Designs, Richard created some of the most impactful outdoor furniture pieces of both the modern and postmodern design periods. Richard was trained in both mechanical engineering and design at Iowa State University and later the Illinois Institute of Technology (where Mies Van Der Rohe was so influential). After school, Schultz joined Knoll in 1951 to work under Harry Bertoia and assist in developing the wire collection. After gaining experience at the Knoll company, he was given the opportunity to design pieces of his own, often working closely with Florence Knoll or “Shu” as she was known. We had the chance to discuss this topic with Richard’s son Peter and saw early sketches of Richard’s with annotations and critiques written on them by Florence. By 1960, the outdoor Petal Table was introduced, which used a cast aluminum base in tandem with weather-resilient redwood petals on the top. By the mid 1960s, Florence Knoll had moved to Florida and was not pleased with how rusty steel outdoor furniture would become in that climate. Richard responded with the 1966 Collection. This series, Schultz’s most iconic, is constructed from sculptural cast aluminum components, which are powder coated for further resilience to the elements. The seating pieces use a pressure fitted connection to attach slings, which use a synthetic mesh and outdoor belting leather-like material, reinforced with a metal bar for strength. The tables use porcelain-coated steel top with a vibrant array of colors often used.

By 1972, Richard Schultz left Knoll and was able to eventually negotiate taking the rights of his designs with him. By 1992, Richard Schultz Designs (his independent brand run alongside his son Peter) had reintroduced the 1966 collection after undergoing further development. Between 1992 and the 2012, Richard Schultz Designs prototyped and developed a number of novel outdoor pieces, including the 2002 Collection and Topiary series (1997). What remained consistent in the designs was an unrelenting attention to how the pieces were engineered and the brave experimental nature with metal fabrication techniques that are not typically seen in furniture design. Richard’s engineer-

ing background and Peter's experience as an architect are certainly reflected in the Richard Schultz Designs pieces.

We have had the opportunity to work with and restore countless pieces of Furniture by Richard Schultz, including numerous variants of the 1966 Collection, petal tables, and over three dozen prototypes, which were acquired directly from Peter Schultz. In collecting works by Richard Schultz, buyers should be aware of the longevity of some parts versus others. The cast aluminum frames are generally resilient, though the finish tends to flake off over the years. The finishes can be easily stripped and re-coated for decades of use again. Slings and redwood tops, however, depend on age and condition. Early redwood tops can often split and oxidize if used heavily outdoors. If the petals are intact, they can be sanded and refinished, sometimes requiring additional adhesive if splitting has begun. With the mesh slings, these are the most difficult to salvage. If there are holes or tears, the slings will likely need to be re-done and they are quite costly. Feel free to reach out to us if you need guidance on restoring pieces like this. The last topic to note is that pieces from the 1966 Collection by Knoll and later pieces produced by Richard Schultz Designs have slightly different seat and table heights, with later pieces being slightly taller. Mesh connections also vary slightly for some of the armchairs. Keep this in mind if acquiring multiple pieces for a set.



Nicos Zographos



Nicos Zographos is an architect, furniture designer, and interior designer, known for his work on some of the most iconic modernist interiors from the late 1950s to 1980s and beyond. While Zographos designs can be found in so many of these iconic buildings, his name often goes less recognized, as architectural practices were often specifying the furniture in commercial and larger scale projects. After completing his studies at the University of Iowa, Zographos went on to work in the interiors division of Skidmore, Owings, and Merrill (SOM) architects from 1957-1962. It was here that he formed a close relationship with SOM and was engaged in designing furniture to accommodate the increasingly modernist and often Miesian interiors of SOM projects at the time. In 1959, the ribbon chair was introduced, which was referential to the Barcelona chair, though used a curved leather upholstered cushion in tandem with a pinched and polished stainless steel frame. Soon after this, Zographos designed the bucket chair in 1960, which repeated the stainless and leather palette, though took on a more graciously curved form even still. By 1964, he had formed Zographos Designs Limited, an independent design house for Zographos furniture.

Throughout the life of his company, over 100 products were eventually offered, all coming from the same design ethos and all using techniques for fabrication, which would allow the furniture to become heirloom pieces. This range included numerous variations on the bucket chair, dining and conference tables (often using the distinct “Alpha” base), side and coffee tables, sofas, etc. What is so distinct about Zographos furniture is that his meticulous detailing and choice of materials typically went above and beyond what would be done for Knoll or Herman Miller furniture for instance. Whereas works by Ray and Charles Eames as well as Florence Knoll were often outfitting corporate interiors also, the production processes often relied on a factory with economies of scale. This meant that chrome plating, wood molding, and metal casting were more feasible at these factories, making large scale production a possibility and costing less money to produce each piece. Because this was not typically the case for Zographos furnishings, there is a far more bespoke feel to how the pieces were designed,

specified, and eventually constructed. Of all of Zographos tables we've had, ranging from small side tables to conference tables, it appears that most if not all were constructed from solid stainless steel, which was typically then hand polished (rarely brushed). This is an unbelievably expensive and labor intensive process, made visible through the polished stainless steel Knoll Barcelona chair, which for a time was offered by Knoll alongside a chrome example at almost twice the price of the chrome.

When Zographos was not using stainless steel, he would sometimes produce works in bronze and there was occasional use of heavy-gauge chromed steel tube, used for the 66 chair as an example. That chair is part of the permanent collection at the Museum of Modern Art. While George and Mira Nakashima's work is coveted because of the handmade and material-centric nature of the furniture, we feel that Zographos work deserves similar attention and respect. Zographos would pair the handmade metal bases with glass, yes, but often with highly figured and rare stone tops. If clients requested wood for table tops, extravagant specifications were not uncommon. Tables with elaborate burl veneers have shown up on the market such as a one with book matched olive burl. We have also had the opportunity to work with some of the Zographos wooden chairs and sofas such as the Saronis series. The construction used solid oak dowels with brilliantly simple but solid joints. In adding comfort and softness to the chairs, Zographos inset a wrapped leather material within the dowels of the armrests. Rather than laying on top, the leather sits perfectly flush with the rest of the wood surface. Again, the detailing is exceptional.

Beyond the furniture itself, it is important to note how important Zographos furniture was to the look and feel of the buildings they were used in. Walter Gropius, I.M. Pei, Phillip Johnson, Hugh Stubbins, and Gordon Bunshaft (partner at SOM for 40+ years) regularly specified Zographos pieces in their buildings. The Hirshhorn Museum on the National Mall in Washington, D.C. by Gordon Bunshaft still has Zographos benches and Ribbon chairs in regular use. Until recently, a library designed by Hugh Stubbins at Princeton University also used Zographos pieces in the public spaces. We have been lucky enough to acquire a number of his furniture works directly from SOM-Designed buildings, as SOM had continued to specify the furniture until the company was dissolved in the mid-2000's. As was the case with Florence Knoll in her successes, Nicos Zographos was able to fit a need for architects looking to use materials such as stone, steel, and glass in their monumental buildings and skyscrapers. For those architects, Zographos furniture could allow the designers to extend the feelings of grandeur and modernity to the scale of the human body. The furniture became an extension of the architecture and Zographos knew what was needed to accommodate.



The Eames Lounge Chair Guide



The classic Eames lounge chair and ottoman is easy to love and easy to hate. Since 1956, it has been the go-to lounge chair to say “I am sophisticated” or “I know design” or “I made it.” They can be found in the trash pile on the curb in Manhattan (We’ve owned one of those), in grandmas attic, in your lawyer’s home office, or in the homes of the late Steve Jobs and countless other notable names. Some designers may think that the chairs are overused in design projects or maybe too commonplace in magazines, but we think there’s probably a reason for it. The Eames lounge and ottoman were designed by two of the most recognized names in design, Ray and Charles Eames, who were instrumental in changing the landscape of modern design and modern furnishings during the post-war period up until Ray’s passing in the late 1980s. Their influence continues to this day, as furnishings by the Eames can still be found around the world in every type of setting, whether produced by Herman Miller or Vitra. Even unlicensed reproductions give some sense of how important the designers were, in that Eames designs have been some of the most copied furniture to date, along with the Barcelona chair. We’ve seen knockoff Eames plastic chairs with dowel bases pop up everywhere from Amazon to Marshall’s.

Design value aside, what some people may want to know is: 1) How do you know if an Eames lounge chair and ottoman is authentic? 2) How can you tell when an Eames lounge was manufactured? and 3) How rare or valuable is an old chair and ottoman versus a new one? With these all in mind, we’re going to run through a chronology of the Eames lounge production and explain when changes were made and how you can help tell a real from a fake. We hope that this can be the most comprehensive resource available to understand the production of Herman Miller Eames lounge chairs and ottoman, otherwise known as the 670 and 671.



Swivel Ottoman / Holy Grail

Look back to the original debut of the Eames lounge on NBC and you can see the holy grail in action. Within the community of collectors, the Eames lounge with swiveling ottoman is the most coveted and sought after variant, as it is the earliest traceable version. The details are not so widely known, though we have considerable experience with these chairs and have a few notable details to point out. First off, it is widely believed that this version with swiveling ottoman was produced for a very short period, perhaps for weeks to months. Similarly, is it thought that these examples may have been produced at the Eames office in Venice, California or otherwise in California nearby, but not at the Herman Miller facility in Zeeland, Michigan. Of the ten or so original examples we've had, none of them were found with tags or labels on the ottoman and we believe it's possible that the chairs also were not given labels or medallions during this production run. What we also know is that there were roughly two versions of the swivel ottoman sets. Since Ray and Charles Eames were constantly changing and improving the design, these changed are not perfectly associated with specific timing, but reflect methodical iterations and logical improvements.

1. The most rare and early was distinct in that it had six shock mounts (rubber bumpers) on the backrest, which were identical in size. They did not have two larger shock mounts on the headrest. On the inside of the plywood panels, they also had a unique connection with four snapping buttons, but no clips, as we see on all chairs since. The chair also had two screws used underneath the armrests, which were located in a different location than any other lounges and ottomans. Whereas examples from the late 50s and onward had two screws closer together, this variant uniquely had two screws very far apart. We have owned two examples with the small headrest shock mounts as described. One of them appears more recent, in that it no longer had 4 buttons for the cushions and instead had a rectangular version of the pre-1971 cushion clip style. Aside from these differentiating factors, it was otherwise identical to the next swivel ottoman variation. We have seen this type of example on three occasions, twice through ownership and once from another seller.

2. The variant that came immediately after this is still unbelievably rare, but we have dealt with them eight times approximately in-house and seen a handful from sellers, in the collection of the Museum of Modern Art, and in photos from the personal collection of Charles and Ray Eames (in the Eames house). This version has the noteworthy swiveling ottoman, which has distinct hardware, designed to allow the ottoman to swivel. It also has a small gap (1/8 inch or 3mm approximately) between the shaft of the ottoman and the cast aluminum support that the wood is screwed into. The chair has smaller and finer threaded feet (called Domes of Silence), which use 8/32 threads as opposed to later 1950s examples and beyond, which use 1/4 20 threads. The 670 base was adopted from a 1955 Eames dining table, which used the same glides and threads. Because the table did not hold the weight of a person, the smaller threads were sufficient. It was soon learned that the small threads did not hold the weight of a person well and therefore, they were later changed to 1/4 20 (much thicker steel). Under the armrests of this version, you will find three holes drilled. For whatever reason, slot-

ted screws were used more commonly early on, which transitioned to Philips within a couple of years. This is sometime noted on the large screws used to secure the headrest, as well as the screws used to secure the bases to the plywood panels. Aside from this, you will note that the base of the ottoman is not drilled underneath and was used with slip-on boot glides. While these examples have had round pre-1971 cushion clips, it would not be surprising to see the earlier rectangular clip used, as this may have carried on loosely while the swivel ottoman variant was being changed. As far as timing for these and numbers produced, it is assumed that these were made during 1956, potentially earlier if any were considered pre-production. Regardless, they are rare.



Fixed Ottoman

Last 1956 variant with boot glides: In our Eames lounge chronology, we are still in the year 1956. From discussions with scholars such as Daniel Ostroff and readings, the Eames office received word from customers that children were spinning on the ottoman and hurting themselves or causing frustration. As a result, a decision was made soon after production to end the swiveling functionality and make the ottoman fixed. This leaves us with one version, which is still thought to be produced in 1956. This example has all of the details typical of other late 1950s chairs, with a few exceptions. Some of these chairs used the 8/32 threads carried over from the swivel ottoman examples on the domes of silence. We have not seen these threads on any versions after the boot glide examples. These also had a range of labels used on them. We have owned some versions, which had rectangular foil labels (typically thought to be used from 1951-1956... thanks to Robert Deeming at [Eames.com])(<http://eames.com>) for the date information). Other examples have used the round and white Herman Miller medallion, used well into the late 1950s and early 1960s. Some examples have not shown evidence of labels, though the label having fallen off is also possible. While this detail is not exclusive to versions with slip-on boot glides, these sets consistently have three screws under the armrests. Based on readings and scholarly discussions also, complaints also came in from customers early on in production because the slip-on boot glides would come off easily and get lost. Furthermore, it was difficult to keep them balanced on unlevelled surfaces. A change was quickly made so that the ottoman glides were also drilled and threaded with Domes of Silence used shortly after for the ottoman.



Late 1950s Variant:

It is thought that the boot glides were retired during the year 1956 or potentially a bit later. Regardless, the next iteration retained all typical pre-1971 details, though it had 3 screws under the armrests and a white round medallion as the Herman Miller label. Variants with this combination date to circa 1957 on the early side and as late as 1960. We have had one example in-house with a label inside the cushion dated to December 4th, 1959.



1960-1971 Variant

Examples from the early 1960s onward will no longer have three screws under the armrests and will instead have two. The use of three screws likely stopped during the year 1960. In that same year, another notable change occurred. Herman Miller was incorporated and was then noted on patent labels as Herman Miller, Inc. as opposed to Herman Miller Furniture Company prior to that year. The round white medallion was used until 1964 (thanks again, Eames.com), where it was then replaced with a black medallion of the same shape and style. Later that year, the label changed again, but only slightly with a ring removed. That label was used into the late 1960s. While this has not been further verified, we have also seen a third round black medallion, which we believe to have been used circa 1969-1971. It has been found only with transitional Eames lounges, as changes were made to the newer clip and cushion style. What is notable about the 1960-1971 set is that these will have cushions filled with duck and goose feathers, rubber used for the shock mounts on the back, round clips used to connect the cushions to the plywood panels, a shinier glove-grade leather used for the upholstery, cardboard-like backing for the cushions, and a round metal Herman Miller medallion. Chairs that pre-date this also use the same leather and cushion construction. All of these chairs use Brazilian rosewood veneer for the inside and outside face of the plywood, including pre 1960 examples.



1971-1991 Variant

In 1971, multiple changes were made all at once or at least, roughly at once. First off, the cushions were changed from feather-filled to foam and fiber-filled cushions. These look more plump and also tend to stay in better condition over time. From observation, it also seems as though new and more durable leather was sourced, as the feel and sheen changed. To the cushion backings, a textured plastic board was then used, replacing the older and less durable cardboard-like backing. In order to connect the cushions, metal hardware was no longer needed on the cushions. Instead, a cut was made to the backing and a round, metal clip was then developed for use on the plywood panels. This allowed for a more fitted and seamless connection to the plywood with almost no gap whatsoever between plywood and cushion. From observation, the type of finish and sourcing of Brazilian rosewood may have also changed at this point, as the finish took on a slightly greater sheen and rosewood after this period was sometimes more dramatic. The cast aluminum bases also have a more refinished finish, whereas the casting marks were often rougher on earlier examples. These characteristics would likely be attributed to new tooling used at the factory along with the slight changes. During this time, Brazilian rosewood was also used exclusively. Circa 1974 (thanks again to Eames.com), the plywood panels were changed to incorporate seven layers rather than five as was used before, providing additional strength. The bumpers or shock mounts used on the back and headrest were also changed to plastic. During this period, Herman Miller used a black rectangular label with rounded edges. Larger paper labels are also more commonly found on these versions in addition to the patent labels.



1991-Present Variant

In 1991, Herman Miller stopped the usage of Brazilian rosewood veneer, as Brazilian rosewood was about to be put on the endangered species list. Herman Miller changed their wood sourcing to domestic hardwoods, then offering only cherry and walnut veneered plywood. From 1991 until 2006, these were the only options available. As the Eames lounge approached its 50th anniversary, Herman Miller made efforts to look into sourcing sustainable rosewood. They reintroduced rosewood with a Santos Palisander, a similar species to the original Brazilian rosewood, but with more responsible sourcing. This has been offered as an option ever since, along with a white ash option and an all black version. The labels used on these are either the silver Herman Miller rectangular label used until circa 2008 or the Eames Office label used from 2008 onward.

Why Emeco?



Emeco is a sustainable company, a producer of finely crafted objects, and a design house known for some of today's most interesting and innovative recycled products. The company is most known for their iconic navy chair, which has been in continuous production since 1944. Today, Emeco offers an expansive range of furniture across numerous materials, with a dedication to recycled materials and sustainable processes. They have also collaborated with influential designers, including Philippe Starck, Jasper Morrison, Norman Foster, Frank Gehry, Jean Nouvel, Andrée Putman, Ettore Sottsass, and beyond.

Emeco is an American company based out of Hanover, Pennsylvania. They are not a traditional “environmentally-conscious” company; they are obsessed. The classic navy chair is made entirely from recycled aluminum, the Coca-Cola chair uses at least 111 recycled bottles, and the Navy Wood Chair is beautifully crafted in solid hardwood with locally sourced trees from sustainably managed forests. They understand material and how to responsibly use it.

What we appreciate about Emeco is their dedication to good design and care for the impact of the products they make. Emeco does not make the world's most expensive or most complicated products. Instead, they manufacture lasting pieces, which can be used in a school cafeteria, modern art museum, or home office. Each Emeco product shares the same DNA. Each will last, will be made of quality material, will be meticulously crafted, will be uniquely Emeco, and will use thoughtfully-sourced material. Ray and Charles Eames were innovators of their time in considering the life cycle and longevity of their products before sustainability became a noteworthy term. Emeco is representative of an Eamesian thoughtfulness and in many ways, carrying on or building upon the Eames' legacy. We are proud to represent Emeco products.

The Navy Chair

The navy chair is an icon with a long and celebrated history. Beginning its life on navy ships in WWII, it was then sold to hospitals... prisons... and government offices because it was virtually indestructible. In recent decades, it has been recognized as the design icon that it is and can be found within iconic works of architecture. It has traditionally been brushed aluminum, but has now taken on new roles in recycled plastic, ash, walnut, polished finishes, and with unique upholstery or multi-material configurations. No matter its form, it is pure and instantly recognizable. At Rarify, we'd go for the classic side chair in brushed aluminum, walnut, or polished aluminum if we were feeling swanky. The Coca-Cola chair should not, however, be overlooked. It has great hand feel and weight to it, with a lower cost.



The Hudson Chair

Do we have a soft spot for the Hudson chair? Absolutely. It retains the simplicity and craftsmanship of the iconic navy chair, but goes one step further. Rather than using a back with three referential aluminum spindles as the Navy Chair does, the Hudson chair erases that detail and replaces it with a gorgeous curved surface of aluminum with a small reveal between the seat. Whether the finish is brushed or polished aluminum, it creates a seductive canvas of aluminum to touch, look at, and/or sit in. We've noticed that it seems to actually share the lower seat and leg forms with the navy chair. Starck surgically iterated upon the Navy Chair and created a new icon for this century. At Rarify, we're glad that we only have two choices for finishes. Both are gorgeous. Go for polished if you can, but the brushed is a great value with terrific material feel. The side chair or higher stools would be our choice depending on what you need them for.



The Icon Chair

The Icon chair by Starck has such a similarly striking silhouette to the Hudson, but instead of showing off its big brushed or shiny back, it instead leaves absence in its place. It can also stack, which is convenient and doesn't look bad, which can't be said about most stacking chairs. At Rar-

ify, we like the Icon as a bar or counter stool, but maybe less than the Hudson as a dining or side chair. Whereas the Hudson is more supportive and better to spend a long time in, the Icon looks just as good, but with more flexibility as a stacking chair and with a considerably lower price tag.

The Lancaster Chair

We were wrong about the Lancaster chair. We didn't love the Lancaster chair from the photos we first saw. We thought the seat and back were plastic and wasn't sure about the multi-material construction. Once we had a chance to see it and touch it, our eyes were opened. The Lancaster chair is a thing of beauty. The seat and back are in fact die-cast aluminum, which carries more weight and thickness than most other Emeco aluminum products. The wooden legs are finished beautifully and their form is refined. If you want to something beautifully constructed, this chair makes a compelling argument. At Rarify, we would go for the dark ash wooden legs with dark gray powder-coated aluminum or polished aluminum. The polished finish will look best initially maybe, but the dark gray will look new forever and will be much more resilient to scratching than the polished finish.



The 1951 Chair

The 1951 is a hot rod or restomod of a long lost Emeco design. We're happy to report that Emeco brought on Adrian van Hooydonk from BMW Designworks to reinterpret the chair and give it new life with a modern yet retro color and material palette. The designer is known for striking BMW concept cars across the last couple of decades. The 1951 chair's frame is hand-made from aluminum tube much like the Navy chair. The colorful seat and back, made from recycled plastic bottles, sits a quarter inch or so offset from the frame, allowing the frame to shine, while creating an opportunity for color and comfort. At Rarify, we like the colorful options for the 1951 chair and we like that they stack. If we needed color, this would be an obvious choice, probably in yellow. The price is extremely reasonable given the quality and the look is classically Emeco. The stools are just as cool.



The 1 Inch

The 1 Inch chair's offerings are expansive and extremely customizable. Jasper Morrison designed a product that was functional (stacking, attractive, durable) and could also suitably serve its needs in a recycled plastic or aluminum. After spending some time with one of the 1 Inch Reclaimed chairs up-close, we appreciated the unique material quality of the recycled plastic, which uses 90% industrial waste, including 2% wood fiber. The wood fiber gives a very subtle speckle. For around \$200, it's hard to find anything as well made as the reclaimed chair. In aluminum, we particularly like the upholstered chairs in Kvadrat wool and the all aluminum examples with perforated backs and seats.



Broom

We like the Broom chair, but we love the broom stools. To begin, the broom collection takes its name from its material makeup. It is made from the shop floor. This means 75% reclaimed polypropylene (plastic), 15% wood fiber, and 10% glass fiber. This type of up-cycled waste is extremely difficult to repurpose, primarily because companies do not typically want to work with it. Emeco has made an exceptionally unique and interesting composite material from this waste. Whereas the 1 inch reclaimed uses some 2% wood fiber, the increase of wood and glass fiber in the Broom makes the material all the more intriguing to look at up close. Whereas we may be more particular about where and how a broom stacking chair is used at home, the broom stools are very elegant and have much smoother curvature. There is an inset aluminum bar for your feet and we find both stools to be very comfortable.



The 20-06

Lord Norman Foster is known for some of the world's most prolific works of architecture. There is Hearst Tower in New York, The Gherkin in London, the Reichstag Dome in Berlin, and so many others. They share a level of refinement and innovation, which Foster's firm has become known for. The 20-06 series extends these qualities to Emeco's classic aluminum furniture. There is

innovation in scaling down the size of tubing to be lightweight, while maintaining a strong chair. The use of sheet material for the seat and back of the chair is subtle and minimal, while also allowing the chair to stack with others. The stools are similarly thoughtful, using material only as needed. At rarify, we love each of the four seating iterations. The brushed aluminum finish is elegant, though the addition of black or cognac leather padding elevates the chairs without distilling the lines.

Alfi

The Alfi series by Jasper Morrison is simple, affordable, and well made. It is not our favorite Emeco product, nor is it the most beautiful, but it does take on upholstery very well and uses the multi-material construction to its advantage. The slip-on upholstered covers are brilliant. With a plastic back, it does not feel as robust as the Broom or 1 Inch series, however, it is transformed to a much softer feeling chair when upholstered. The wooden bases are crafted in Lancaster, Pennsylvania and are very nicely detailed. We would recommend an Alfi Soft Chair with Slipcover, preferably with the dark ash base. Both Maharam and Kvadrat make excellent textiles, so there are no bad choices there.



The Emeco Stool

The Emeco stool has quickly become a modern classic. It is understated and exceptionally practical. For kitchen islands or bars, food halls or pulled-up to a piano, it works. The stool was designed by Starck for the MoMa's retrospective on "Mies Van Der Rohe in Berlin." The stools are comfortable at home, in industrial settings, or within cutting-edge architecture. We've had a chance to use a low stool with a leather seat pad and also to enjoy the counter and bar height versions. All of them have Emeco's classic look and feel without adornments. The polished finish is beautiful of course, but the brushed is just as good.



Emeco Designers

Philippe Starck

Philippe Starck is a prolific designer, known most notably for his industrial design objects and interiors. He has worked on a number of hotels, including the SLS in Beverly Hills, Hudson and Paramount in New York, Delano in Miami, and many others. These engage playful materials and furnishings, often bespoke designs by Starck. Starck's explorations in product design and furniture have expansive breadth in material, form, cost, and scale. He designed a series of whimsically-functional household products and children's accessories for Target in 2002, bringing his work to the masses at very modest prices. The Louis Ghost Chair for Kartell, made in lucite, has become another icon, bringing a postmodern and affordable approach to the traditional Louis XVI armchairs. In the world of luxury, Starck has also made their mark. Grand furniture pieces for Cassina, juicers and beyond for Alessi, 18k gold-plated lamps for Flos, and others have become noteworthy and important designs for the past decades.

At Rarify, Starck's works can be found among both the new and classic collections. Starck's designs for Emeco are available, including the Hudson chairs and Broom series.

Jasper Morrison

Jasper Morrison is a product and furniture designer, who has worked across countless design houses and manufacturers since the late 1980s. Trained in design at Kingston Polytechnic and post-graduate studies from the Royal College of Art in London, Morrison has built a reputation for creating simple and often unassuming products, which reveal their novelty and genius through their simplicity. Morrison has designed trains and refrigerators, tea kettles and training shoes. In the realm of furniture and lighting, collaborations with Vitra, Emeco, Magis, and Flos have been very successful. To put it simply, Morrison's designs and products are those which you purchase and own



because you need them in your life and because they are useful.

We admire many of Morrison's designs, notably the Glo-Ball and Superloon lamps for Flos, and 1-inch chairs for Emeco. Loud is not always the answer and Morrison's work is proof.

Norman Foster

Lord Norman Foster is one of the most renowned architects of this century and last. Foster and Partners has designed and delivered iconic works of architecture from The Gherkin in London, Hearst Tower in New York, Apple Park (spaceship) in Cupertino, to the Reichstag dome in Berlin. Foster and his firm became innovators in high performance buildings, advanced fabrication, and energy-efficient buildings way before any of these concepts were appreciated or cool. Foster hosts workshops on topics such as robotics, collaborates with companies such as Boston Dynamics on pressing issues in technology, and has designed products representing his design ethos for brands like Vitra and Tecno.



Emeco launched the 20-06 series by Norman Foster in 2006, which has since been exhibited as part of the Cooper Hewitt's design Triennial. The series is visually delicate yet super strong, with the stool being able to hold 1,000 pounds, while weighing only 7 pounds.

Adrian van Hooydonk

Adrian Van Hooydonk is an automotive designer and director of BMW's Design Group. Joining BMW in 1992, he has been noteworthy for leading design on a number of radical concept cars and production car designs. This includes the Mini ACV30, BMW Z9 (precursor to the later 6-series), BMW X5, BMW 5 Series (2010), and recent BMW I4 concept. While his design work typically stays in the automotive world, he has dabbled in product design collaborations for the 1951 chair by Emeco. Helping to reimagine a long lost Emeco design, Adrian and BMW Design Group were instrumental in bringing this product to life.



We are big fans of Adrian Van Hooydonk's concept

cars and similarly appreciate the 1951 series by Emeco. The chairs are retro yet futuristic, classic yet charismatic.

Michael Young

Michael Young is a British-born designer based in Hong Kong. His work has spanned across furniture, interiors, and product design. Young has worked with brands such as Coalesse and Georg Jensen. Museums including the Louvre and Centre Pompidou in Paris have showcased his work.

Michael Young's Lancaster series of tables and chairs for Emeco is available on Rarify. We appreciate Young's choice to design legs that would be crafted by Amish woodworkers in Lancaster, Pennsylvania and to develop die-cast aluminum parts and joinery for the table and chair series. The exceptional attention to detail and manufacturing processes is seen and felt clearly through the end products.





We learned that burlled woods with unique geometries and textures make the process of 3D scanning much faster and more accurate, as opposed to using minimally textured or geometrically consistent objects. This is a rendering of a Nakashima side table in English Oak Burl and Black Walnut without any refining or adjustments. This is the result directly from the scanner. The model is crisp because there is enough varied information in the physical table to keep the scanner aligned constantly.





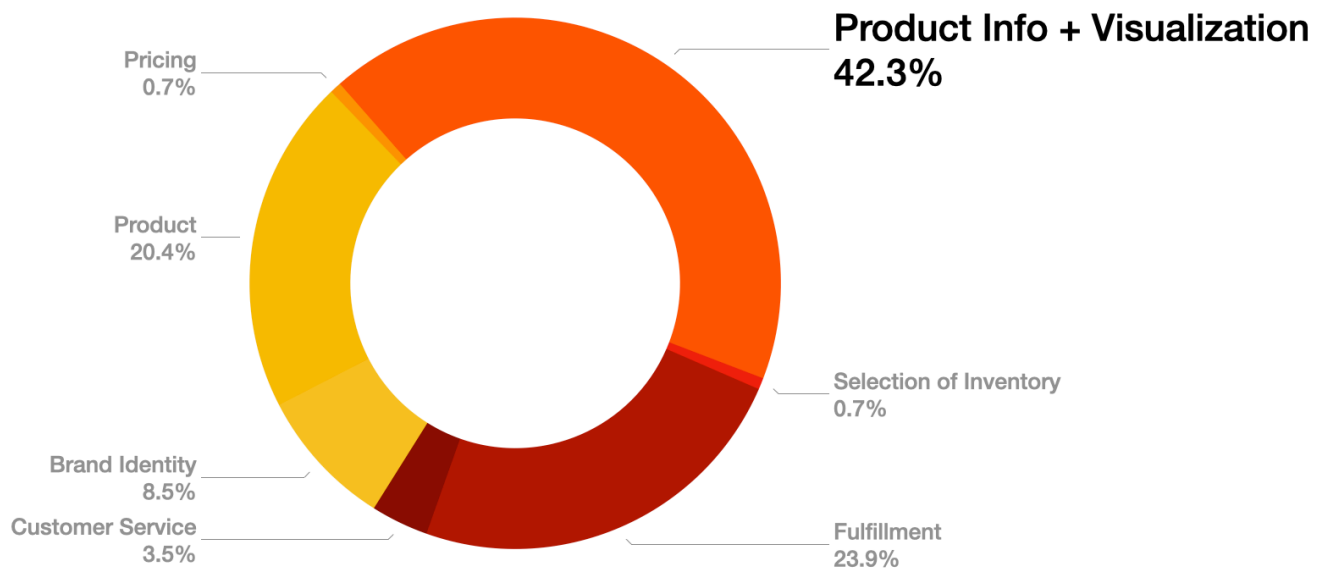




The image above shows a sampling of the material palette that was used to test Emeco's products as part of the initial pilot. Variations of the navy chair are shown in walnut, brushed aluminum, and recycled plastic. There are also die-cast aluminum parts, upholstered parts, and multi-material chairs shown.



Speed and quality are some of the biggest topics in question as it relates to 3D scanning as part of a visualization pipeline. This is the Broom bar stool before the texture is applied, after, and a photograph of the exact stool for comparison.



We also conducted a survey of over 100 past customers, asking for pain points when buying designer furniture online. The most frequent pain point we heard, by far, was that customers didn't feel like they had enough information to make a purchase online. This means not enough images, detail shots of pieces, and specs, to give buyers the confidence needed to invest in a high quality piece of design. In many cases, this led to concerns about authenticity in both new and vintage products.

25-40 → **40-65**

Cares about good design.

Tired of IKEA.

Ready to upgrade to reach items.

75k/yr+

Design enthusiast.

Wants guaranteed quality.

Can afford good design.

150k/yr+

Market

Who are we paying close attention to? The most familiar market to my existing business and competitors are 40-65 in age, already in their prime spending years. These customers are more likely to buy \$5k+ items and with more regularity.

We are, however, looking to reach the 25-40 audience, aiming to pull them out of Ikea and into design pieces that they love. We will convince this audience that iconic designs can be affordable, hoping that they'll become returning customers as they enter their prime spending years.



Vintage

George Nakashima



Contemporary

Mario Bellini



New

Norman Foster

Over the last ten years of running D ROSE MOD, dealing with used and vintage pieces, I've always paid close attention to design value, rarity, collectability, and desirability.... Such as the three pieces you see. When we talk about our collection, this is what we mean, across very different price points as well. These all have exceptional design value.



As a pilot, we scanned 20 Emeco products over 3 weeks and countless hours to test our process with their material palette. This includes aluminum, recycled composites, hardwoods and upholstery. These are some of those scans rendered.



Resolution

The resolution of the Einscan H is remarkable. You can see the 3d file and how zoomed in we are looking at one small injection molding detail. For online hosting, we need to strike a balance of high resolution while maintaining a reasonable file size.



Resolution

The scanner picks up on geometry such as raised lettering underneath a stool. In this case, you are seeing these letters in mesh form, which were scanned in the “medium” setting with an Einscan H 3D scanner. The letters have a depth (extrusion from surface) of approximately 2mm.

Troubleshooting
**Scan alignment around
small diameters**



Where issues arise is in aligning different parts of the scan. While this can be smoothed out, the time to do so is considerable. What you see are some of these issues straight from the scanner. In the case of a bar stool or counter stool especially, the long and fairly consistent legs provide unique challenges. The 3D scanner is constantly searching for familiar swaths of data, such as a recognizable grouping of pixels or texture. Because a leg is slim and often free of detail, it is especially challenging.



Troubleshooting
**Black and dark
surfaces**



Troubleshooting
**Shiny and reflective
surfaces**



Troubleshooting
**Repetitive areas with
minimal texture**

The scanner struggles in cases such as what is shown above.

1. Black surfaces are difficult because of how the light hits the surface.
2. Shiny and reflective surfaces too... making polished materials or glass nearly impossible.
3. Lastly, long repetitive areas (like a bar stool leg) make it difficult for the scanner to maintain its location.

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