

Journal of NATURAL SCIENCE ILLUSTRATION

GUILD OF NATURAL SCIENCE ILLUSTRATORS



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Note from the Editor

We are thrilled to celebrate the 12th year of the current version of the *Journal of Natural Science Illustration*. Over the past decade-plus, our journal has served as the venue for our members to publish a diverse range of articles that educate and inspire our community. From detailed scientific illustrations to insightful process discussions and innovative techniques, our journal showcases the incredible talent and dedication of natural science illustrators worldwide. Each issue serves not only as a testament to the skill of our members but also as a resource that promotes the “art and science” of illustrating the Sciences.

We encourage all members to consider submitting articles about their work for upcoming issues. Your unique perspectives and experiences are invaluable to the continued growth and richness of our journal. Additionally, if you know of other potential authors—whether they are members of the Guild of Natural Science Illustrators (GNSI) or not—please point them in our direction or us in their direction. We are always on the lookout for fresh voices and new talent that can contribute to the educational and artistic goals of our publication.

In our updated call for “Pages from My Sketchbook,” we invite you to share interesting pages from your sketchbooks along with short descriptions of the circumstances surrounding their creation. This series is a beloved feature of our journal, offering a glimpse into the personal creative processes of our members. Whether your sketches are spontaneous field notes or detailed studies, they provide invaluable insights and inspiration to our readers. We look forward to seeing the fascinating and varied contributions that you have to offer.

Creating the *Journal of Natural Science Illustration* would be impossible without the input, expertise, and willingness to share from our members. Your contributions, whether in the form of articles, sketches, or suggestions for new authors, are what make each issue special. We are deeply grateful for your continued support and dedication, and we look forward to many more years of collaboration and creativity. Thank you for being an integral part of our journal's success.

—Britt Griswold, Senior Consulting Editor

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Cover: *Milkweed*. ©2024 Rhonda Nass

Back Cover: Screenshot of GNSI's professional gallery, *Portfolio+*. Clockwise from top left: *Sonoran Desert Friends* by Rachel Ivanyi; *Prairie Dog (Cynomys) Ecosystem* by Marjorie Leggett; *Plant Cell* by Elizabeth Morales; *SARS Virus* by Lisa Wable; *Aglais io* by Quinn Sedig; *Penguins of the World* by Rachel Ivanyi. Artwork copyrighted by individual artists.

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The Guild of Natural Science Illustrators is a nonprofit organization devoted to providing information about and encouraging high standards of competence in the field of natural science illustration. The Guild offers membership to those employed or genuinely interested in natural scientific illustration.

GNSI GENERAL INFORMATION MEMBERSHIP

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Scratchboard Illustration Techniques

— Rhonda Nass

Though scratchboard as a professional art began in the 1800s as black-and-white illustration reproduced for books and newspapers, many people have since experienced scratchboard in a grade school art class with black ink over crayons and a sharp tool scratching away differing amounts of ink, revealing portions of the colorful layer beneath. For children it was a memorable work of wonder!

Today's scratchboard artists follow the same concepts, starting with a foundation board of Masonite® covered with kaolin China white clay with black India ink atop the clay. They then scratch the surface using an abrasive tool (often an X-Acto® knife blade) to remove the top ink layer in varying degrees with varying hand pressure—with light scratching exposing a bit of white, making a charcoal gray, to heavier scratching (or more layers of light scratching) exposing pure white clay (*Fig. 1*). Because these

steps take away rather than add to the prepared base, scratchboard is called a subtractive process. Today many scratchboard works are regarded as fine art, appearing in galleries, museums, exhibitions, and are sought by private and corporate collectors.

My scratchboard introduction was not as a child in grade school, but as an adult with master scratchboard artist Trudy Nicholson, a Guild of Natural Science Illustrators' colleague who worked for the

Figure 1: A clematis bloom and mulberry leaves distinctly exhibit the full value range from black (ink) to white (clay) with many grays between—a good introduction for those who have little experience with scratchboard. The mulberry leaf scratchboard won the Gold Award/Signature in 2023 at Tucson's Arizona Sonora Desert Museum conference.

All artwork and photos
© Rhonda Nass unless
otherwise noted.

Smithsonian Institution. Decades later when the COVID-19 pandemic hit, I used Trudy's and other artists' works as inspiration to teach myself scratchboard. Incredibly, it was a seamless transition. The stroke I use as a colored pencil artist—a stroke I call the “airplane stroke” because it approaches the paper gently connecting with the surface, then gently lifts from the paper (a pilot's “touch-and-go”)—is the exact stroke I use with scratchboard. I literally replaced the colored pencil usually found in my hand with the X-Acto knife and proceeded as if drawing, with the blade gently scratching the premanufactured, black ink-covered scratchboard panel, removing the ink, revealing the gray, lighter grays, and white beneath.

Because scratchboard is not (yet!) a common medium for botanical artists, I hope to encourage you to try it by modeling the step-by-step process I used to complete *Beauty Amidst Damage* (Fig. 9, page 7).

Step 1: Collect Supplies

My go-to scratchboard supplies (Fig. 2) include the following items:

- A “sanity window,” a small window cut from paper
- Two pre-inked scratchboard panels (I prefer 6” × 6,” but there are many sizes available)
- X-Acto knife with extra blade (I use #11 style)
- Red and black Pigma Micron® pens
- Graphite (HB) pencil



Figure 2: Scratchboard supplies. A “sanity window” (left middle) is a small window cut from paper which allows one to see an intentionally limited area of the reference photo, building confidence to proceed for even complex textures.

- Feather or brush to gently brush away scratched ink residuals
- A bit of 150-grade sandpaper for woodworking
- A rag to wipe the sandpaper-sharpened blade
- Masking tape
- Translucent tracing paper (I use Canson Tracing®)
- Transfer paper, either manufactured (Sara®) or handmade (Canson Tracing plus soft HB graphite, or translucent vellum plus white colored pencil, applied in one direction on one side)
- Lascaux® brand finishing spray (archival varnish with UV protection)

Step 2: Determine Concept/ Message/Subject Choice

Sometimes the allure of a subject inspires a work, e.g., the holes and resultant shadows created from dried, insect-eaten leaves. Or sometimes the birth of an artwork begins with an idea, e.g., “beauty despite brokenness,” and we choose a subject to communicate the concept.

Step 3: Create Reference/Source Material

Painting live for a black-and-white scratchboard has the disadvantage of requiring mental translation from color to value—a very challenging and usually inaccurate task. By using my own photography I can arrange dramatic lighting, change color to grayscale via computer/phone/photo studio, and cut and paste



Figure 3: I shoot 30 or so photographs of my chosen subject, then enter them in Photoshop and alter lighting to my taste, translate color to grayscale (if graphite or scratchboard), then cut and paste what I want to include in a photo composite. The composite will be the reference guiding my drawing.

to create an easily readable photo composite (Fig. 3, previous page).

Step 4: Design Composition

My usual composition go-to is the “rule of thirds,” placing the focal point at any intersection of lines created when the height and width of the format are divided in equal thirds. But for this layout I felt there was not one clear focal point, so I adjusted my approach.

Step 5: Trace and Transfer the Drawing

You may prefer drawing directly from your source material to paper. I most often trace outlines from my designed photo composite using a graphite pencil on tracing paper. Then with the inked panel down first, the transfer paper with graphite side down atop the panel, and the tracing paper with outlines atop that,

I retrace graphite lines with a red Pigma Micron pen. If interrupted, red shows transferred lines. At times I make the transfer paper with white colored pencil on translucent vellum (Fig. 4).

Step 6: Plan for Aces

Aces are the polarized lightest light and darkest dark values of any medium. In scratchboard the ink is the darkest dark ace, so we address the white ace. By visually planning to remove the whitest white of your subject from your working palette, you typically preserve a pure white clay area later scratched at the very end of your drawing process. Despite the white background of this work, the aces principle still applies. (The concept of aces came in a class I took from Robert Bateman, conservationist and wildlife artist... best art lesson ever!)



Figure 4 (above left): I transfer my preliminary drawing to the black scratchboard using transfer paper. I made this transfer paper with white colored pencil on one side of translucent vellum.

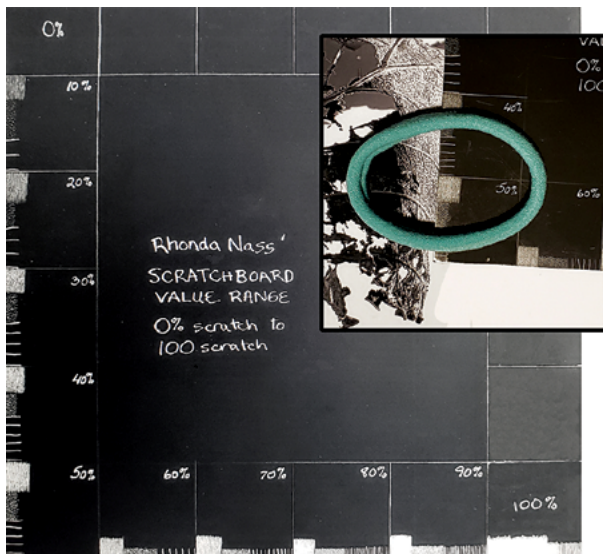


Figure 5 (above right): I made the scratchboard “value match guide” once and have used it repeatedly to convey an accurate value range from black to white, with shades of gray in-between. I labeled each segment of this value continuum with the percent of black removed (e.g. black = 0% to white = 100%). This is useful when placed adjacent to the photo composite, and guides and gives confidence to the artist to know how much black to remove on the scratchboard to replicate the photo values. The close-up inset shows how I placed the value-match guide atop a portion of the photo, revealing how much ink I need to scratch off to match the photo value shown.



Figure 6 (right): Guided by the photo reference, then guidelines on scratchboard, sections at the outline of the leaf and “holes” within shadows are scratched layer by layer to reveal white clay.

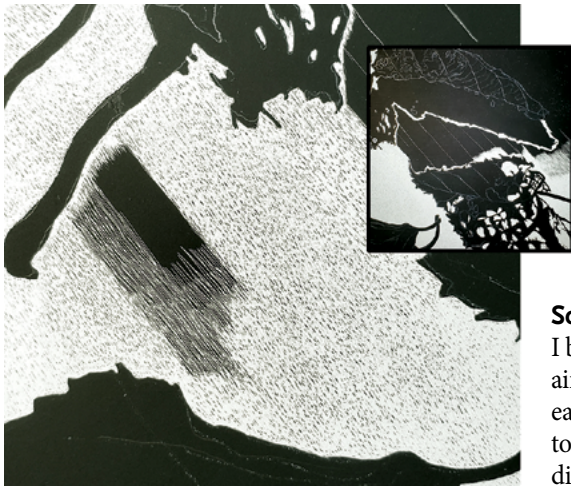


Fig. 7 (above): The white background is created by scratching layer by layer following the directional guidelines, resulting in consistency throughout the piece. This was my first piece with a white background, and you'll see the inexperience of trying to merge the white outline of the leaves previously scratched in one direction with the later white background scratching in another direction. Always learning!

Step 7: Create a Value-Match Guide
This lifelong tool will ensure accurate value transfers from photography to original art (Fig. 5, previous page).

Step 8: Start the Scratching Process
I begin scratching using the airplane stroke described earlier, working from dark to light, and determining the direction of the stroke based on the subject's contours

(Figs. 6, 7, and 8). Remember, it's always easier to remove more ink than to correct, but adding ink with a black Pigma Micron pen to the mistakenly over-whitened areas will allow re-scratching for the corrected value.

Step 9: Scratch the Aces
About a half hour from completion, I scratch the white aces at the focal point(s), which will magnetize viewers' eyes to the light-contrasting center of interest (Fig. 9, next page).

Step 10: Sign the Work
On black surfaces, I add my signature using a white ink pen or gray colored pencil so it will show up well. On white surfaces I sign using black ink pen.

Step 11: Seal for Protection
I spray about six coats of Lascaux brand archival and UV protection sealant on the final work.

Step 12: Frame the Work
My framing favorites include mounting the scratchboard art with double-sided tape on a 2- to 3-inch-deep birch wood panel, or floating the scratchboard art over an unscratched scratchboard panel in a black frame. Most professional scratchboard artists do not use glass or glazing.

Other artists' steps will vary. Colored scratchboards use brushed watercolor, dyes, or colored inks atop the scratched work, re-scratching highlights for clean whites.

More inspiration for scratchboard can be found at scratchboardsociety.org. I encourage you to try scratchboard. Enjoy!



Figure 8 (below): This triptych shows different stages of the artwork, displaying the parallel, side-by-side, closely aligned strokes that make up the tonal bodies of values and the direction of strokes that follow the curled leaf contours.

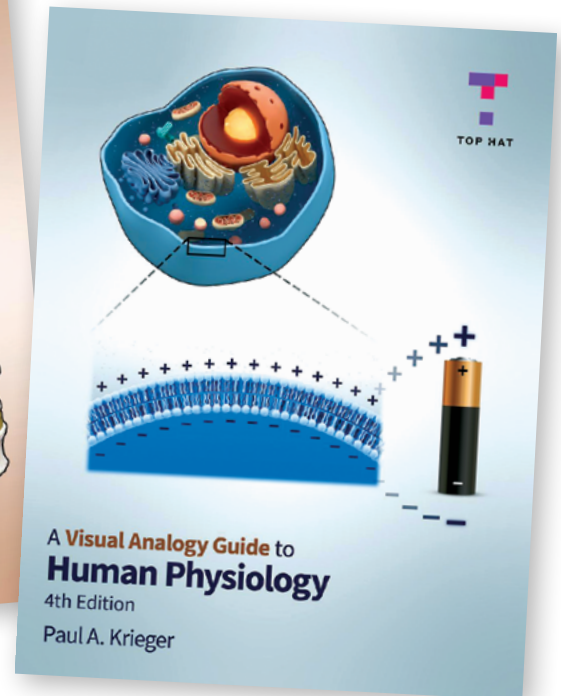
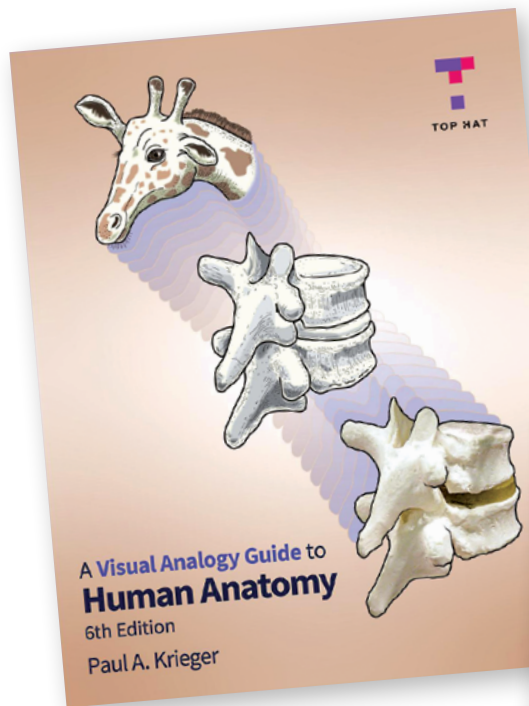




Figure 9: The intentionally reserved aces (darkest dark/black ink and lightest light/white clay) are usually added in the last half hour at the focal point to make the dramatic contrast that draws the viewer to the artist's chosen focal point. But this piece was handled uniquely since the background was the whitest white and there were few highlights in the leaves themselves. The finished artwork, *Beauty Amidst Damage*, won the Gold Award/Signature from the International Society of Scratchboard Artists' 2022 annual conference in Bradenton, Florida.

About the Artist

Rhonda Nass creates graphite, scratchboard, colored pencil, and acrylic works for private, gallery, museum, and corporate collections. Her work is published internationally. Her drawings and paintings can be viewed at www.rnass.com/rhonda and in self-published books, *Gifts from the Earth* (graphite) and *Scratchings of a Madwoman* (colored pencil) are available via contact info on the website. Mention "GNSI" and *Gifts* will be discounted to \$15, *Scratchings* to \$30.



My Book Transformation from Print to Digital

— Paul A. Krieger

In higher education publishing, there is a sea change occurring as textbooks and other educational materials move from print to digital and interactive. Having already gone through this process with three of my four books, I would like to share my experience.

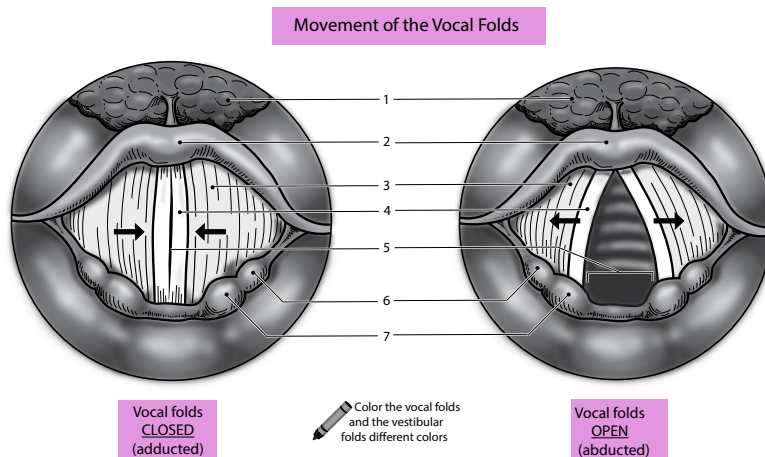
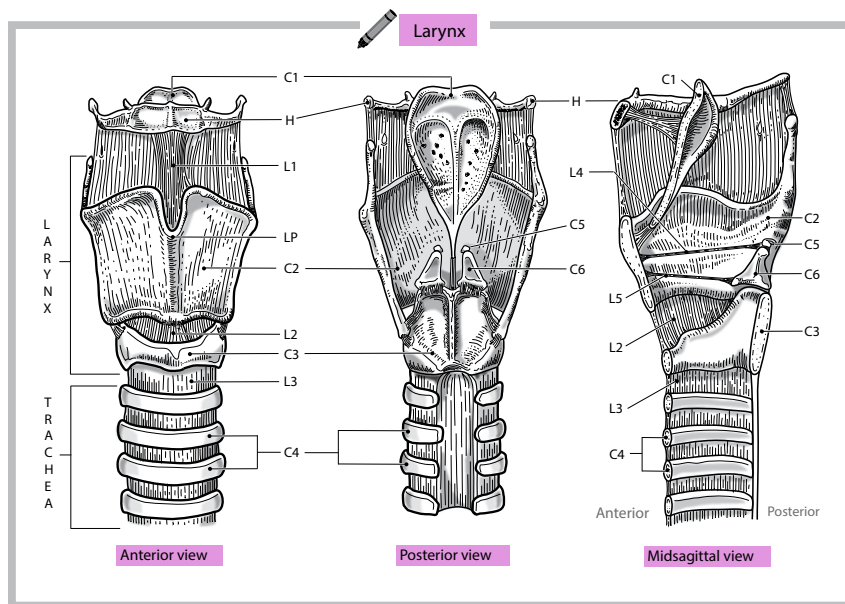
First, I need to offer some background information. About 20 years ago, I authored and illustrated my first educational book titled *A Visual Analogy Guide to Human Anatomy* (368 pages). As a professor of anatomy and physiology for over 28 years, the original idea for my first book was born while teaching students in the lab. While studying the skeletal system, I used to make sketches to show students who were not visual learners how a thoracic vertebra looked like a giraffe head and a lumbar vertebra looked like a moose head. By superimposing the known (animal head) on the unknown (vertebrae), I was using a contextualized learning approach to help students better see and learn anatomy. My students found this so helpful that they encouraged me to write a book. At first, I shrugged it off thinking that

something like this already existed in the marketplace. Later, after doing some research, I discovered that there really wasn't anything quite like it.

After refining my book concept, I decided to create a two-color, consumable, stand-alone book in a modular format. Each module would cover a key concept in a two-page spread with a text page on the left side and a large illustration page on the right side. My illustrations were intended to be simplified but anatomically correct contour line illustrations that invited students to color and to write notes on them. Unlike textbooks, it would follow a “less is more” approach by focusing on core concepts to help students better learn anatomy rather than overwhelming them with a large tome of content.

Above: Digital book editions. Published in March 2024 by Top Hat.

All images © Paul A. Krieger unless otherwise noted.



In addition to my analogies, I would also include study tips, mnemonics, and other learning tips that I had accumulated over the years. My target audience was the same as my students—undergraduates such as prospective nurses and others entering the medical and health professions taking their required anatomy and physiology course.

Getting published was a very difficult process. I submitted my book concept to all the large educational publishers and received one rejection letter after another. To them, my book was a big risk because it didn't fit into their predetermined boxes of either a "textbook" or a "lab manual." Then I remembered a small publisher called Morton Publishing who specialized in educational supplements such as photographic atlases, dissection guides and also lab manuals. Most of their business was in the biological sciences, and my book concept seemed to be a good fit with them. After submitting my book proposal,

they immediately understood the value of it and signed me to my first book contract in 2003.

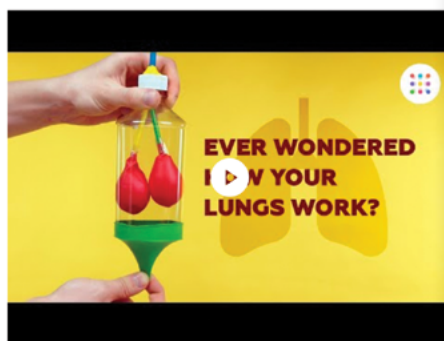
Thankfully, my first book proved to be a success and was well-received by students all across the U.S. and Canada. This led to me to create a Visual Analogy Guide series with three other books: *A Visual Analogy Guide to Human Physiology* (384 pages), *A Visual Analogy Guide to Human Anatomy & Physiology* (608 pages), and *A Visual Analogy Guide to Chemistry* (304 pages). All four books went into later editions and improved significantly over the years.

A major turning point for me and my books came in 2021 when my small publisher, Morton Publishing, was acquired by an EdTech startup company called Top Hat. As the company grew, they began acquiring small publishers with the goal of offering fully digital, interactive textbooks on their platform that professors could customize according to their needs.

Above: Example of a printable coloring page with illustrations of the larynx and vocal folds.

Video

A beautiful, simple demonstration of the application of the pressure and volume law normal breathing is shown in Video 16.5 below.



Video 16.5 Application of Boyle's Law to Normal Breathing [9]

[Long Text Description](#)

Above: Screen capture of a video showing how lungs work.

Right: A 3D model allows students to explore the mechanics of breathing.

3-D Model

Using the embedded tools in the BioDigital model below, explore the **mechanics of breathing** with the heart.



BioDigital 16.3 Mechanics of Breathing

[Long Text Description](#)

I was informed that my print books were all going to be transformed into digital and interactive books.

In January 2023, my editors assigned me a long list of tasks that included selecting external videos and images, editing the text, creating learning objectives, creating my own author videos, customizing my own 3D models, and working in the platform to insert all these learning tools in their proper place. Working with my book team, it took me about 12 months, working an average of about 30 hours a week, to complete this process. It should be noted that at the end of each chapter, credit was given for all videos and images used. By the end of January 2024, my book, *A Visual Analogy Guide to Human Anatomy & Physiology, 5e* went live on the new platform. Then, in early March, *A Visual Analogy Guide to Human Anatomy, 6e* and *A Visual Analogy Guide to Human Physiology, 4e* also went live on their platform.

The process of transforming my books from print to digital and interactive required me to rethink the book format and the graphic layout and design. For example, page turning was replaced by scrolling. I no longer had a two-page spread for a modular format so that layout wasn't possible anymore. The most exciting part for me was the new set of interactive tools that I incorporated into my books.

The following is a comprehensive list of all the new interactive tools I integrated into my digital books.

- **Author videos:** These were narrated PowerPoints I created that allowed me to add my personal voice and teaching style to my books.

- **Interactive self-quizzes:** My illustrations in my printed books had numbers and leader lines pointing out specific anatomical structures. The corresponding answer key was on the facing page. This old-school quizzing method was replaced by a technology called a ThingLink that allows students to move a cursor to a circle at the end of a leader line and the name of the structure magically appears.

- **3D interactive models:** Top Hat has a licensing agreement with a company called BioDigital that produced a customizable 3D model of the human body and all its organ systems. I created customized models for all my books. Students are able to move the models in any direction, zoom in and out, and turn labels on and off. Amazing!

- **External videos:** I selected YouTube videos that permitted commercial use so I could showcase important processes and concepts such as blood flow through the heart, cellular respiration, and cadaver tutorials. A compliance officer checked the license in the video description to verify that commercial use was permitted.

- **Full-color photos and photomicrographs:** Remember that my original books were two-color, not full-color. This was the first time I had the opportunity to add full-color photos, illustrations, and photomicrographs from Shutterstock. I was also able to add full color to my own illustrations based on the chosen color palette for the book.

LINKS

Video showcasing the interactive digital tools used in my book:

www.youtube.com/watch?v=9kbByu3T5qk

Anatomy and Physiology book:
<https://bit.ly/4cQpHLI>

Anatomy book:
<https://bit.ly/3TjPNRt>

Physiology book:
<https://bit.ly/3TjPNRt>

- **Printable coloring pages:** at the end of each chapter I added a “coloring pages” section that allows students to either print out a PDF to color one of my illustrations or to upload a PDF to a drawing app and color it digitally.
- **Auto-graded assessments:** I created hundreds of questions at the end of each chapter such as multiple choice, sorting, fill-in-the-blanks, and matching questions.
- **Learning-objective based content:** my original book did not contain learning objectives. The digital version has learning objectives for every module, which is much more organized and improves student learning.
- **Embedded rollover glossary:** in the text blue-colored terms have a rollover glossary. Students hover their cursor over the term and the definition and pronunciation appear on the screen.
- **Audio pronunciations:** these are commonly found throughout the text for key terms.

After completing my journey from print to digital, I’m excited to see if it is able to improve the teaching and learning process. I handpicked the most effective educational videos and images available to me to enhance my original content. Students simply log in to the platform, and all the interactive tools mentioned above are at their fingertips, all in one place. This is a much more engaging way to learn, and it appeals to a wide variety of learning styles. We are getting to the point where students can almost teach themselves the subject matter now.



The **semilunar valve** flap opens like a **kangaroo pouch** to catch blood and prevent it from falling back into the ventricle.

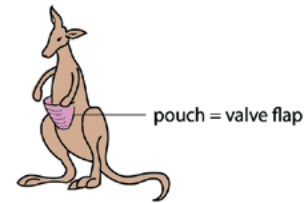


Figure 14.9 Kangaroo Pouch Analogy [6]

[Long Text Description](#)

The **atrioventricular valves** (**tricuspid** and **bicuspid**) and associated structures resemble a **parachute**. The **valve flaps** are the **parachute**, the **parachute cords** are the **chordae tendineae**, and the **paratrooper** is the **papillary muscle**.

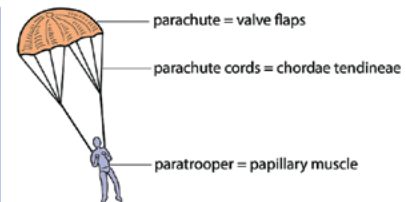


Figure 14.10 Parachute Analogy [7]

[Long Text Description](#)

Above: Familiar analogies help students better understand the anatomy of heart valves.



About the Artist

With a long and varied teaching career that spans over 30 years, Paul A. Krieger is Professor Emeritus of Anatomy and Physiology at Grand Rapids Community College, where he was awarded the Emeritus Faculty Award—the highest honor bestowed on a faculty member. With encouragement from his students, Paul wrote and illustrated his bestselling Visual Analogy Guide series, which includes separate books for anatomy, physiology, anatomy and physiology, and chemistry.

Professor Krieger has been an active member and has held leadership roles in many professional organizations such as the Human Anatomy and Physiology Society, the Michigan Community College Biologists, and the Textbook and Academic Authors Association. He has successfully presented numerous workshops at local, state, and national levels on various topics, such as improving the teaching and learning process. In addition to teaching and authoring, Paul is also an accomplished artist and scientific illustrator. He lives with his spouse and son in Grand Rapids, Michigan.

Right: Photo of the art installation.

All images © Taina Litwak unless otherwise noted.



Art Installation

Plastic and Electronics Pollution, Climate Change, and Biodiversity Loss

— Taina Litwak

In early January of 2024, I heard there would be an unjuried art exhibit event in an old office building in downtown Washington, D.C. A half-room space cost only \$150 in this Artomatic Show, which would be open to the public for a full seven weeks. I had done a half-room installation in a similar whole-building show in 1983 and it was a highlight of my creative life to date. Without hesitation, I knew I wanted to make a statement about climate change. I wanted to have control of a whole room so I paid for a double space (\$300) and waited on pins and needles to see what kind of room I could get.



I had a solid idea of what I wanted to do—to create an immersive experience, evoke an emotional reaction, and elicit thought. I first envisioned a chest-level monochromatic sea of plastic banked around the room, with a pile/tower in the center. The viewer would walk a narrow path through the sea of debris. All the bright and shiny plastics we live with and are surrounded by, so varied in texture and purpose, are reduced by the uniform paint to the thing they have in common—they are all made of toxic petrochemicals. They will persist in the environment for thousands of years and are accumulating in the bodies of every living thing on the planet. And I do love Louise Nevelson's work.¹

My paintings/collages on canvas, all about climate change and biodiversity loss, are colorful and would hang above the dark “water” line. Installation in the space would not start till February 17th, so I had a month to collect and paint all the elements. This included advertising on the neighborhood Facebook “Buy Nothing” site for large plastic kids' toys (which I no longer had as my children are long grown), a few trips to thrift stores specifically for a barbie or two,

dumpster diving at the loading dock at the museum where I work, and nabbing car parts abandoned by the side of the road. After many late nights and weekend days spent brush painting all things plastic (and a variety of small dead electronics), I had amassed what I hoped would be enough.

Room selection did not happen until February 11th, so I did a lot of the prep work on faith that I'd get a space I could work with. Much hand wringing and dashing about went into the site choosing, as there were six stories of rooms, many already spoken for, in a seemingly endless network of confusing corridors. I finally chose a more or less 9-by 13-foot room on the seventh floor.

I work full time, so I had three weekends to do the installation. Several sets of young friends helped me with painting the room and designing and adding lighting, and my son helped with lugging the materials in. I decided to hang the paintings densely to balance the space and sketched the arrangement in advance on paper. Plans changed a bit once it was all in the space, but I ended up with 21 paintings on the

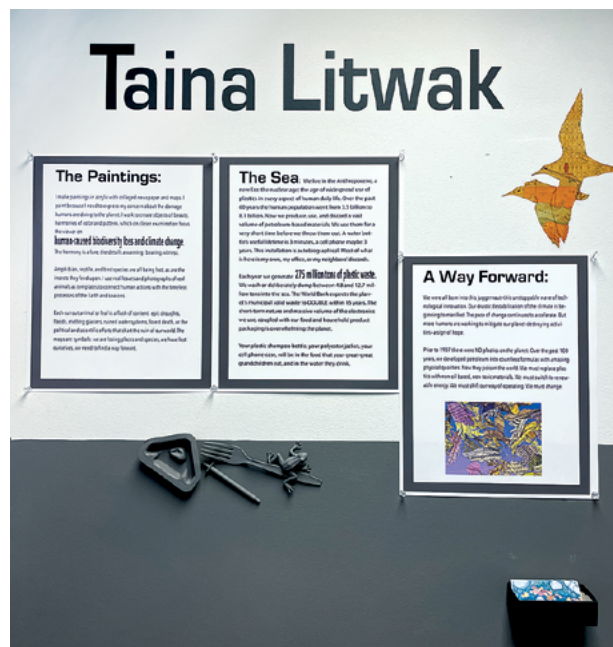
Left: Plastic and electronics painted a uniform color.

Right: Close up of painted debris in the installation.

¹ Louise Nevelson was a famous sculptor known for her monochromatic wooden wall installations and outdoor sculptures. Born in Pereiaslav, Ukraine, she emigrated with her family to the U.S. in the 1920s.

Left: Painting of a shark with plastic debris floating on the "waterline" in the installation.

Right: Exhibit signs.



walls. Once I started to fill the space, I gave up on the idea of an island of plastic to walk around. The room was just too small. But my image had evolved to feature a mass of smaller plastic items floating on the "surface" and drifting through the "water column."

This triggered cutting many things in half—vinyl records, CDs, food trays, bottles, and shoes—and digging up a bag of hot glue sticks. I never did decide upon a title, so I just listed it under my name, ordered vinyl lettering, and put that up. The last bottle cap and Lego went onto the wall on the final night of the installation period and I took a set of photographs. It was an odd sensation driving away that night—the end of an intense two-month process.

I feel strongly that the message in my work is important, and that if you believe in something, it increases the penetration of the message if you expend the effort to promote it. So, in the week between physically finishing it and the exhibit opening I designed and sent out an e-mail invitation, ordered new business cards, designed and had 250 postcards printed, curated my mailing list, and mailed out 70 of the cards. I'm of the mindset that if you have something to say, "go big or go home."

The Artomatic Show, with 800 artists and many music and film performances has been well-advertised and attended. The highest single-day attendance was 10,000 people. Over the seven weeks, I spent many

hours in my space, explaining and discussing the issues I care about with an incredibly varied bunch of visitors. I will treasure the looks on some strangers' faces as they stood in the room. I provided 60 hours of volunteer gallery sitting and bartending, met a lot

of cool local artists, and sold four small paintings. I've been invited to give a presentation about my work at the national headquarters of the Natural Resources Defense Council (an organization I have supported for decades)

and I'm optimistic that more things may come of this as time goes by. I do have hopes I can do another version of this installation in another location.

The Paintings

I make paintings in acrylic with collaged newspaper. I paint because I need to express my concern about the damage humans are doing to the planet. I work to create objects of beauty, harmonies of color, and patterns, which on closer examination focus the viewer on the issues of human-caused biodiversity loss and climate change. The harmony is a lure, the details a warning, bearing witness. I use silhouetted shapes cut from newspaper headlines and maps. Amphibian, reptile, and bird species are all disappearing, as are the insects they feed upon. I use real leaves and photographs of real animals as templates to connect human actions with the timeless processes of the Earth and the seasons. Each cut-out animal or leaf is a flash of content: epic droughts, floods, melting glaciers, ruined water systems, forest death, or the

"I paint because I need to express my concern about the damage humans are doing to the planet."

— TAINA LITWAK

political and scientific efforts that chart the ruin of our world. The maps are symbols: we are losing places and species, we have lost ourselves, we need to find a way forward.

The Room

We live in the Anthropocene—the nuclear age, the age of widespread use of plastics in every aspect of human daily life. This is a new era. Over the past 60 years, the human population went from 3.5 billion to 8.1 billion. Now we produce, use, and discard a vast volume of petroleum-based materials. We use them for a very short time before we throw them out. A water bottle's useful lifetime is three minutes, a cell phone maybe three years. This is an autobiographical installation. This assemblage of plastics and electronics are mostly my own, from my office, or my neighbors' discards.

Each year humans generate 275 million tons of plastic waste. We wash or deliberately dump between 4.8 and 12.7 million tons into the sea. The World Bank expects the planet's municipal solid waste to *double* within 15 years. The short-term nature and massive volume of the electronics we use, coupled with our food and household product packaging is overwhelming the planet.

Your plastic shampoo bottle, your polyester jacket, and your cell phone case will be in the food that your great-great-grandchildren eat, and in the water they drink.

A Way Forward

We were all born into this juggernaut—this unstoppable wave of technological innovation. Our drastic destabilization of the climate is beginning to manifest. The pace of change continues to accelerate. But more humans are working to mitigate our planet-destroying activities—a sign of hope.

Prior to 1907 there were no plastics on the planet. Over the past 100 years, we developed petroleum into countless formulas with amazing physical qualities. Now they poison the world. We must replace plastics with petroleum-free, non-toxic materials. We must switch to renewable energy. We must shift our way of operating. We must change.

“Your plastic shampoo bottle, your polyester jacket, and your cell phone-case will be in the food that your great-great-grandchildren eat, and in the water they drink.”

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Left: The artist meets with visitors in the exhibit.

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