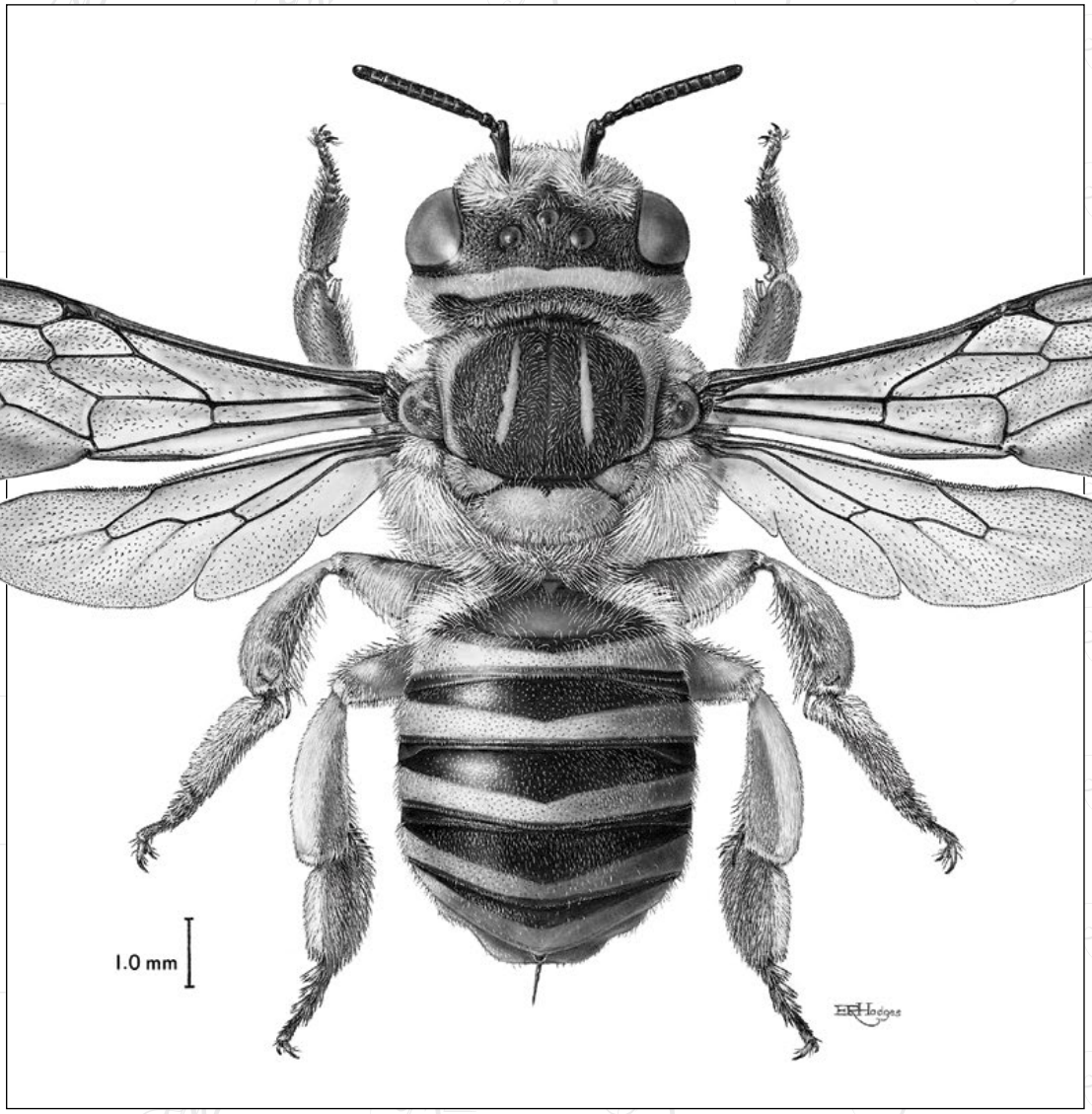
Journal of Natural Science Illustration

GUILD OF NATURAL SCIENCE ILLUSTRATORS



VOLUME 51 • NUMBER 3 • 2019

A Note From...

Camille Werther, Production Editor, JNSI

Greetings from your Journal team! At this busy time of year, we hope that you can find some quiet moments to savor the beautiful images and inspirational articles contributed by our members in this issue.

The Member Spotlight features Ikumi Kayama, who is also the recipient of this year's GNSI Distinguished Service Award. Her path to a career in scientific illustration is an interesting one, and we are grateful to her for sharing it with us. Trudy Nicholson's article about Elaine Hodges is a real treat for those of us who did not have the opportunity to meet her. It is both an introduction to Elaine and a window into the history of the Guild. Elaine's career included editing the *Guild Handbook of Scientific Illustration*, which many of us rely on as a resource. Also in this issue, Dino Pulerà describes his path to publication of the 3rd volume of *The Dissection of Vertebrates*, Sara Taliaferro gives us her thoughts on the Australian conference, Britt Griswold brings us Listserve advice, and Madison Erin Mayfield shares fieldwork sketches of sugar gliders in our ongoing Sketchbook feature.

In this issue there are a few reminders to make plans now to attend the GNSI 2020 Conference in Salt Lake City (*see pg 17 and back cover*). More information about speakers and programs will be available soon.

By now, you may have seen the announcements in our social media channels about upcoming Focus Issues. We hope that by highlighting specific areas of scientific illustration, members who contribute will benefit from being a part of a themed issue. The full schedule is included in this issue (*pg 22*) and on the GNSI website at *www.gnsi.org/jnsi-focus-issues-2020*. Focus Issues may feature a mix of the main topic articles along with other topics; please continue to submit any article ideas you may have, even if it is not related to the focus topic. If you have an idea for an article, or sketchbook pages to share, contact one of our editors at the email address below. We look forward to hearing from you!

— Camille Werther
journal@gnsi.org

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Cover: Leaf cutter bee *Trachusa* (*Heteranthidium*) *bequaeti* (female) (Megachilidae), carbon dust on Ross board no.00. © Smithsonian Institution

NATURAL SCIENCE ILLUSTRATORS

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

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In Memoriam: Elaine R. S. Hodges

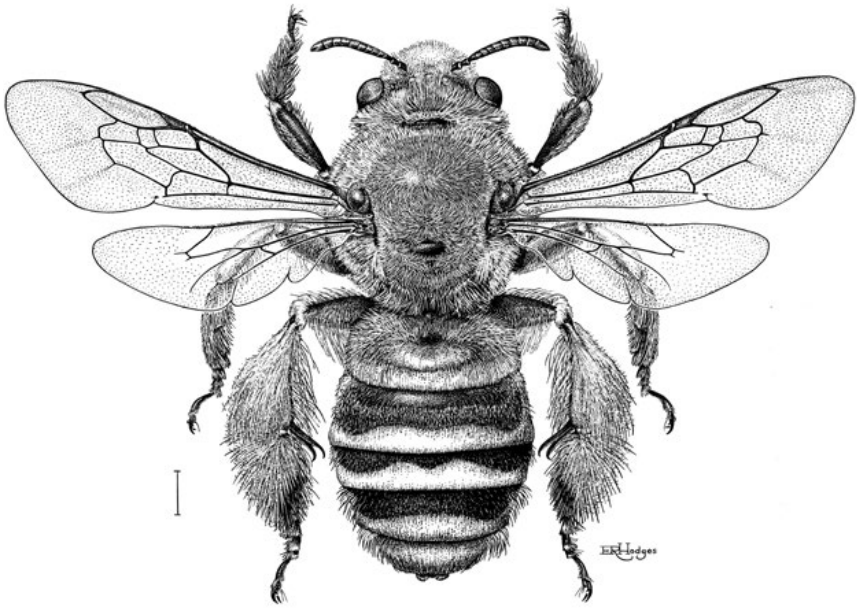
— Trudy Nicholson

Casting our minds back 51 years, we find two young natural science illustrators at the Smithsonian National Museum of Natural History. Carolyn Bartlett Gast and Elaine R. S. Hodges had noticed the lack of connection among staff illustrators and had become the prime movers to bridge the gap. In order to do that, Carolyn planned illustrators' luncheons with programs related to the media that would be helpful to these previously isolated artists. This served as a means to introduce illustrators to one another and for them to recognize the benefits of coming together. Carolyn found Elaine to be a willing ally and, as Carolyn saw it, Elaine had enthusiasm for the project as well as access to a typewriter—and could type. With that skill they produced elegant invitations and descriptions of the programs. Their success in this endeavor led to the founding of the Guild of Natural Science Illustrators on December 2, 1968, and the connection among natural science illustrators that we've all enjoyed for 51 years. Thus began a lifelong effort by Elaine to bring together people who specialized in the art of seeing—the art of perceiving an object, not just looking at it. All of this in the service of science.

The Guild started with 21 charter members. The first meetings were held at the National Museum of Natural History with Elaine typing announcements and descriptions of the meetings. As the Guild grew these typed up notes became our Guild Newsletter. As new members joined the Guild, Elaine sent along with the Newsletters several technique sheets that each described a specific artistic technique. Later these technique sheets inspired the Guild Handbook of Scientific Illustration, with Elaine at the helm. The benefits of each Guild expansion and new outgrowth that Elaine created resulted in an increase in Guild membership, which now it reaches around the world to multiple countries.

The driving force that led Elaine to these many roles in the Guild was part of her innate persona. And what led her to the field of art was her natural artistic talent and interest shown during her earliest years, leading to youthful studies at the Corcoran Gallery of Art in Washington D.C. where her family lived. Her artistic plans were sidetracked by her mother's wishes for her to try for the stage. Not a theatrical performer at heart, she finally found the freedom to study at Wilson Teachers College for a year, and then received a scholarship to the Pratt Institute in New York, where she further developed her portrait painting skills. In 1965, on her return to Washington D.C. after a failed marriage, she discovered scientific illustration. That happened by chance. Elaine had taken a job as clerk at the National Museum of Natural History and was employed there for only a few weeks when, during a conversation with a friend, who was working as an illustrator at the Museum, she found out that another illustrator was needed to draw amphipods for Dr. Jerry Barnard there at the Museum, at a higher salary than her clerk's job paid. Taking that job gave her the entry to the rest of her life, despite never having done similar work.

Above: Elaine in her office, 1987.



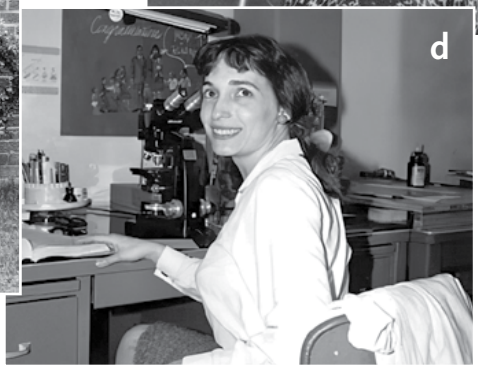
Below: *Diadasia rinconis* Cockerell (female) (Hymenoptera: Apidae), ink on scratchboard, 1981. © Smithsonian Institution

Right: Caddisfly larvae *Smicridea annulicornis* (Trichoptera: Hydropsychidae), carbon dust and diluted ink on Ross board no.00, 1987. © Smithsonian Institution

Neotropical Caddisflies XXXIX: The Genus Smicridea in the Chilean Subregion. No. 472. Smithsonian Contributions to Zoology, 1989.

Drawing Dr. Barnard's amphipods turned out to be a very natural blend of her interest in portraiture and science. She had no problem using a microscope, which seemed like a normal extension of her eyes, revealing a fascinating world of organic microstructures. In 1966 Dr. Barnard moved to Hawaii and Elaine, remaining at the Smithsonian, moved to the Southeast Asia mosquito project where she illustrated for 4½ years, also doing contract work for other departments, drawing such subjects as ostracods and bird parasites. During that time she researched, wrote, and illustrated a paper on mosquitoes and found the research aspect of the experience to be exciting. This work increased her interest in entomology and she also became interested in a particular USDA entomologist, which led to the marriage of Dr. Ronald W. Hodges and Elaine in June 1967. Elaine described the event as elevating her to a perpetual Cloud 9. Their marriage was fulfilling for both. Ron had worked for years on the series *Moths of America North of Mexico, Including Greenland*, with Elaine doing the illustrations. They made quite a team. They were working in entomology, where Elaine became a prominent figure in her field, and Ron having achieved similar status in his field. They formed a happy family with two sons, Steve and Larry.

Below: (*a*) Car: Elaine's mom loved to enter contests. A publicity photo taken of the family in one of her winnings. (*left to right*) Joel (youngest child), father Sam, mother Pat, Sol (oldest brother), Elaine (oldest child), Carolyn (younger sister), and Irv (middle child), 1955 (© unknown). (*b*) Play acting. (*left to right*) Carolyn, Elaine, Irv, and Sol, (Joel not yet born), 1948. (*c*) Elaine works on a portrait of a young girl (Jennifer Adams), 1969. (*d*) Elaine at her microscope, mid-1970s.(*e*) Elaine and Ron on their wedding day, June 1967. (*f*) (*left to right*) Son Larry, mom Elaine, and son Steve, 1965.



Elaine's artwork was impeccable—distinctive yet accurate. She created memorable habitus images of entomological specimens, becoming a master of multiple techniques. In an inventory she kept, there were 93 double-sided pages with 38 entries per page—a total of 3,534 illustrations!

But beyond her skill, her importance became that of a mentor to young illustrators, providing advice, opportunities, and encouragement to become involved in the community of science illustrators.

Under Elaine's guidance, as the Guild moved into the 1970's, still early in its existence, it reached out to many isolated natural science artists scattered across the country and provided them with a packet of newly organized technique sheets that described a number of artistic techniques, their development, materials and tools, and examples, written and illustrated by artists who used the techniques. Over the years, these were polished and added to. It was these

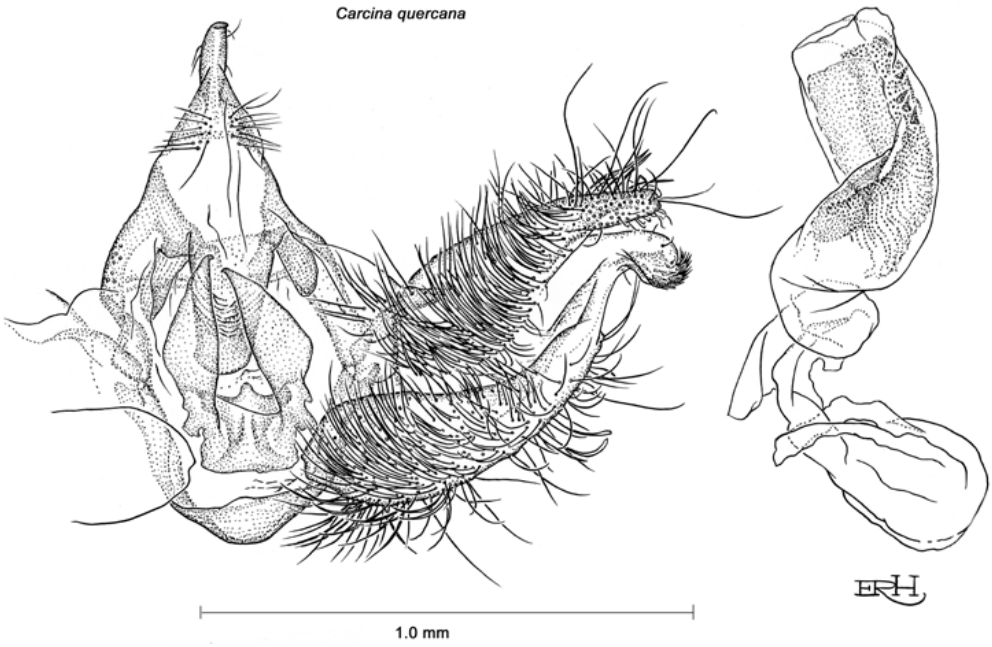
technique sheets that formed kernels of ideas for the *Guild Handbook of Scientific Illustration,* edited by Elaine, sponsored by the Guild, and published by Van Nostrand Reinhold in 1989. A total of 45 authors and 176 illustrators contributed to this book that took 13 years to produce. This was a massive job of editing for Elaine, needing careful oversight for each page. It was a frustrating task requiring Elaine to keep each artist/author on schedule. This book is considered the modern "Bible" of scientific illustration by artists in the field, by scientists interested in illustration, and by libraries across the nation. It has received four book awards. In 1995 it was in its third printing. It is still available, and still fulfilling the need for such a complete source of information in a world that is becoming more visual in its communication needs at an ever increasing pace. When published, the first edition was so successful that Elaine moved on to a second edition, which was published by John Wiley and Sons, Inc. in 2003. Through this set of two books, she shares with us a great wealth of information and lays the groundwork for professional standards in our field.

Above: Elaine poses for a publicity photo in her office after the release of the first edition on the *Guild Handbook of Scientific Illustration*, 1989. © Smithsonian Institution

Elaine was deeply interested in entomology and had been active in several national entomology organizations. She was Vice President of the International Lepidopterists' Society. Elaine had other far-reaching interests beyond art, science, and entomology. The diversity of her interests ranged from international cooking to opera performances. Both she and Ron loved music and not only attended symphony events, but Elaine also sketched while attending them. This collection of sketches was donated to the University of Oregon Music School, where they are displayed in the Eugene Bach Festival headquarters of Berwick Hall. Two nonprofit organizations that Elaine supported were the Wedge Entomological Research Foundation and the Chamber Music Series of the University of Oregon School of Music.

Among the awards she has won, and perhaps the most meaningful to Elaine, was the GNSI Distinguished Service Award in 1995. In the Guild she had served as Correspondence Secretary, Vice

Above: a scratchboard portrait of Elaine created by Trudy Nicholson, one of a collection Trudy created of Guild founders, 2008. © Trudy Nicholson



Left: Moth *Carcina quercana* (male genitalia), pen and ink, 1981. © Smithsonian Institution

Moths of America North of Mexico Gelechiodea by R. W. Hodges pub.

Top right: *C. penalii*, Caddisfly plate, larva: head and larval cases of *Contulma penaii* drawn for Oliver S. Flint (unpublished). © Smithsonian Institution

Below: Going-away party invitation for Elaine and Ron's move to Oregon, from Elaine's sister Carolyn Snyder, June 1997.

Bottom left: Ron and Elaine at the courtyard entrance of their custom-built home in Eugene, OR, ~2003.

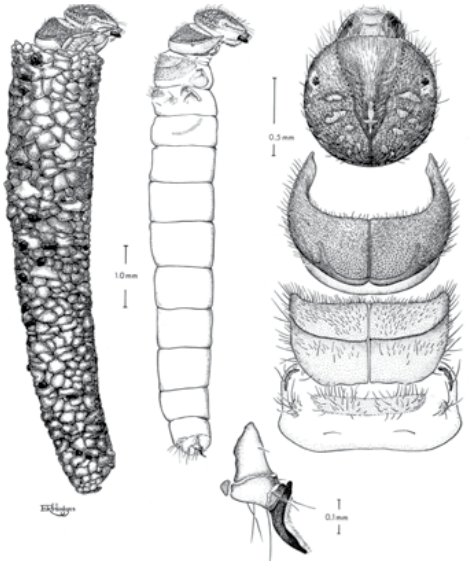
Bottom right: Elaine's license plate, reflecting her passions.

Ghosted background image: Leaf cutter bee *Trachusa* (*Heteranthidium*) *bequaeti* (female) (Megachilidae), carbon dust on Ross board no.00. © Smithsonian Institution

President, and President. She created an exhibit titled *Science and Art: 150 Years of Smithsonian Research* with the Smithsonian Historian, for the Sesquicentennial Celebration of the Smithsonian.

Another very meaningful award she received was the Ranice W. Crosby Distinguished Achievement Award For Pioneering of the Guild of Natural Science Illustrators. It was given on May 26, 2006, by the Johns Hopkins University School of Medicine's Department of Art as Applied to Medicine.

When Ron retired in 1997, he and Elaine traveled around the country, seeing many possible locations to spend their retirement years. They finally settled on Eugene, Oregon, which had a perfect climate for the gardening Ron wanted to do, and attractive local cultural opportunities. It was hard for Elaine to leave so many friends on the east coast, but it turned out that many visited her on the west coast, and she made many friends there.



Life is not always what we want it to be, and Elaine ended up with less time on Earth than she deserved, but she stayed spiritually strong to the end. Elaine R. S. Hodges passed away in June 2006. There was a Memorial Service for Elaine on the west coast, September 2, 2006 in Eugene Oregon, and a Memorial Service for her on the east coast, November 5, 2006 at the Smithsonian National Museum of Natural History, Washington D.C.—where Elaine's artistic career blossomed and where she spent so many years creating beautiful images of nature, and encouraging and overseeing the growth of the Guild.

It's such a pleasure to look back on the day of beginning in 1968. I among many members of the Guild miss the warmth, friendship, and brightness that both Elaine and Carolyn Gast brought to the Guild. Their example has been imprinted into the DNA of the Guild. The Guild has undergone quite a process of growth. It's been a thrilling journey and continues as new members join the force to carry on. These two founders set up the Guild so it would last and grow. Carolyn and Elaine are gone, but the Guild is still going strong and I applaud them for their foresight.

My sincere thanks to Kris Kirkeby and Steve Hodges, who helped considerably in collecting information about Elaine and Ron, and also making Elaine's illustrations available. — Trudy Nicholson

Member Spotlight: IKUMI KAYAMA

Ikumi has been a member of the GNSI since 2005 and works as a medical and scientific illustrator. She's served on the GNSI Board for several years and volunteered with the Conference Committee on and off since 2009.

Above: Ikumi sketching at Denver Botanic Gardens as an artist-in-residence. Photo © Mervi Hjelmroos-Koski 2015

Q: Where were you born?
I was born in Japan and lived there until my family moved to Marietta, Georgia when I was 7 years old. I speak Japanese and English mostly without accents, which confuses a lot of people.

My family is mostly farmers, programmers, or engineers. My great-grandfather on my father's side was from a samurai family and taught tea, flower arranging, and brush art instead of doing what his family wanted him to do, which was working at a bank. My family is very supportive, but they were concerned about my art career—that is, until I got into medical illustration. Now I'm the "doctor" of the family.

My father takes photos of trains as a hobby and we had to go with him when there was a special train on display. We traveled a lot chasing trains when I was younger. My younger sister and I sat in the backseat, usually drawing, reading, or fighting. My mom grew up on a rice farm, so she knows all the insects and frogs.

There were a few early instances that led me to this career looking back. First, I had asthma as a kid and got sick a lot. The problem compounded when we moved to the US where everything is different down to the very basics of date, height, weight, and body temperature. Even when I could barely hold myself up sitting from being so ill, it was really embarrassing for me to watch my parents struggle at doctor's offices trying to explain the medical conditions in English.

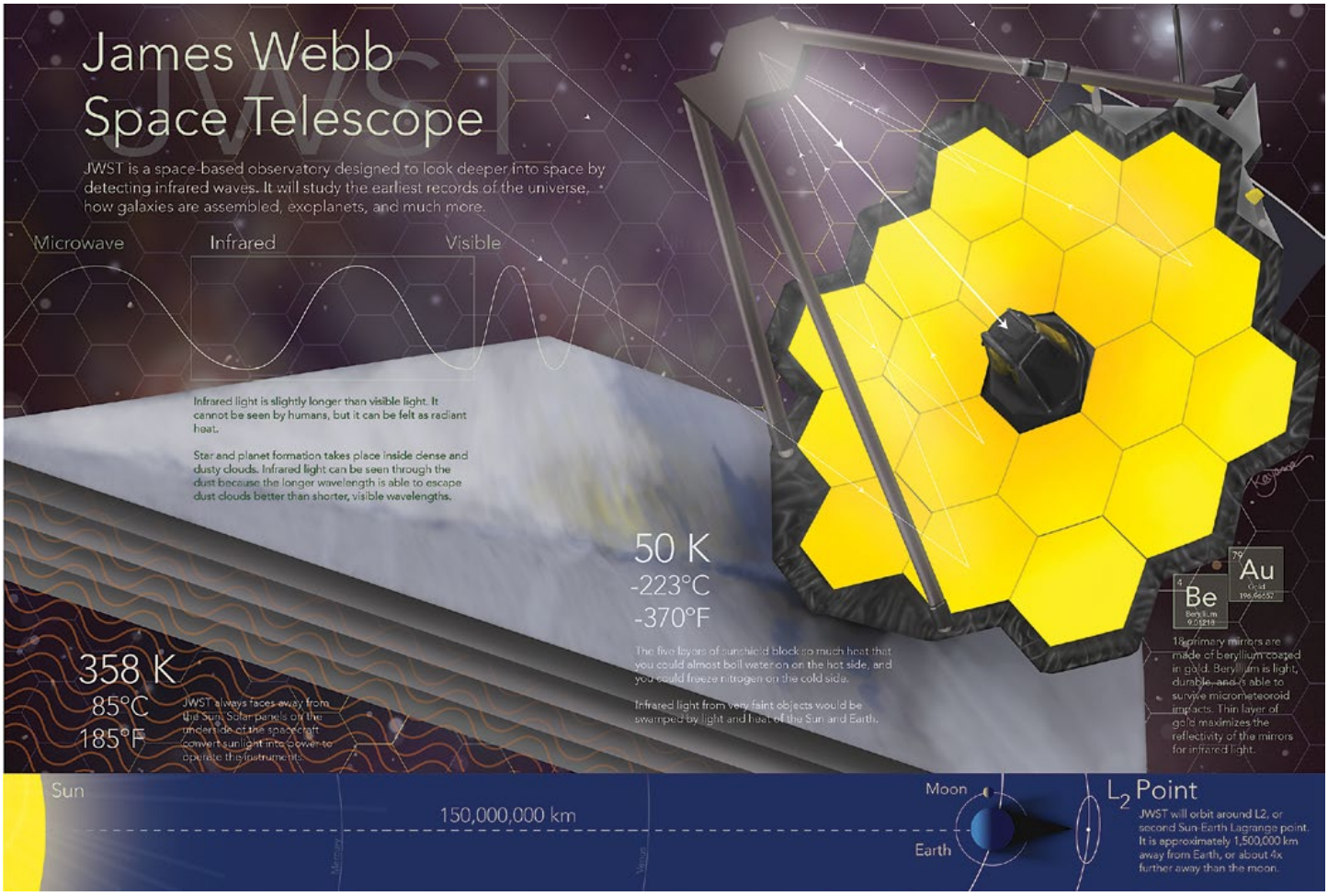
Second, as an enthusiastic insect hunter, my mother and I would go catch insects in the neighborhood in Japan. We would wade through the grass and look up at trees to catch cicadas, grasshoppers, praying mantises, ants, and my mother could catch a dragonfly using her hands only—there's a technique to make them dizzy with your fingers. We had a pet mantis who turned out to be a female, and she had a husband... until she didn't. Getting peed on by cicadas and bitten by dragonflies were all so fascinating and I wanted to learn more. Then one day in kindergarten or first grade, I went up to a table full of rhinoceros beetles and stag beetles. I wanted to hold one! Unfortunately, some boys scolded me, "Back off, these insects are for boys! Go back to your butterflies!" which offended me so much that I didn't like butterflies for a long time.

Third and perhaps the biggest, I had to learn English by myself by being placed in a classroom in Georgia where we were the only Japanese family in the entire school. I felt so dumb and got into trouble because I didn't understand the teacher's instruction in English. I didn't understand why there was one tiny window in the classroom and we weren't allowed to go outside. It was quite tough and sometimes all I could do was to scribble animals using the Crayola crayons on newsprint. Somewhere along the way I figured that drawings are a way to connect people no matter the language, education level, or background.

"Somewhere along the way I figured that drawings are a way to connect people no matter the language, education level, or background."

All illustrations and photos © Ikumi Kayama, unless otherwise noted.

Q: Where do you live?
I live in Riverdale, Maryland (a little north of Washington, DC) and I love it! It's a perfect balance of parties downtown and cow pastures—I mean science and art. University of Maryland is just down



Above: NASA's new James Webb Space Telescope. Adobe Photoshop and Illustrator.

the street to the west, and I can bike to campus. I'm developing a working relationship with various departments and the Student Union. Smithsonian Museum of Natural History is a metro ride away to the south, and I work with the researchers and staff on various projects. NASA Goddard Space Flight Center is down the street to the east, where I was able to see and illustrate the new James Webb Space Telescope. If I head up north, it's an easy drive to Patuxent Wildlife Research Refuge where I help with migration research and bird banding.

"I love scientific illustration because it tells a story and used as a communication and teaching tool."

The art community is quite vibrant here, and I love taking advantage of the local art festivals, figure drawing classes, and get-togethers. There are a lot of opportunities to show and teach art once I was done being overwhelmed by DC and started looking more locally.

Q: Do you have any personal hobbies?

I'm always cold. I started knitting in college—socks, mittens, hats, scarves, sweaters, toys, lace shawls. After graduate school I wanted to save money on yarn, so I got into spinning my own wool. After large investments in time and money, I was finally spinning straw into gold. Then I thought it would be fun to learn how to shear sheep. It was okay. Shearing is a bit like practicing yoga with unwilling sheep. I'll stick with the shorn fleece for now.

I knit when I'm not sketching: on metros, buses, and waiting in general. I get really excited to see a fellow public knitter/crocheter, but my excitement is often extinguished when I see them unwinding their earphone cord, not their creations in yarn.

Because I was trying to relax and knit after sitting around all day illustrating, I started to run a bit. I first completed the Couch-to-5k after not even being able to run for 30 seconds. After you are able to run for a few minutes, then it's more of a mental game than a physical one.

I moved up into training for full marathons. The expansive trail system here is perfect for this and I enjoy casually counting birds and other neat things that live around here. My sister and I go on pilgrimages to Disney parks to run the 'races' through the parks. There are so many goofy races out there and it's so fun. One of my favorites was a race

hosted by the web comic artist The Oatmeal where the theme was a fairy named the Blerch. The Blerch tempts you to eat bacon, drink purple juice, and sit around the couch. The Blerch tempted us as we ran our marathon. One day I'll be serious and work towards Boston.

I try to draw for fun. After about the 760th vertebrate drawing around 2013, I had to draw another something that was not a human nervous system. I drew my pet *Corydoras*[1] at the time, and I've been carrying around a sketchbook with a traveling watercolor kit ever since. I love sketching with pen so I can focus on quantity and moving forward, not noodling for quality. My pen collection was getting a bit expansive and I didn't like that most were disposable. I got back into pen nibs and discovered a whole new nerdy world of fountain pens and inks.

I love reading nonfiction. Right now I'm reading about behavioral psychology. Recently I learned about a branch called behavioral economics and enjoy learning about it too. I love learning as that tends to make the world a slightly less scary place. I enjoy reading old science and anatomy books to appreciate how understanding of the fields have changed over the years. I love that nothing is set in stone.

I like to travel. I particularly enjoy looking at old churches since I was really close to minoring in medieval art history and architecture. I love that the recording methods prior to the printing press were handwritten and hand-carved. Architecture was very much a way to leave records of the past. Counting columns, identifying the saints, prophets, animals, and plants and looking at the materials and styles are all like solving a big puzzle. I also love wandering about, hiking, and trying different foods and drinks.

Q: What are your favorite foods?
I like coffee and wine. I'm also supposed to say collard greens and kale. Caramel.

Q: Any career advice?
How to get started? The best way to get started is to make art. Don't worry too much about what other people say, the style, or if your training is proper or not. Make a lot of all kinds of art until your style and voice start to peek out. Show your art. It takes a while to get traction so don't worry if your first attempts are not perfect. Be the artist. Meet other artists. Offer to help others. Ask for help.

Q: Why sci art?
I love scientific illustration because it tells a story and used as a communication and teaching tool. I love that illustrations can be used no matter the language or education background. I'm so proud that my illustrations are published in many languages—the most interesting one being the Maori language in New Zealand.

"I have made a long and winding journey trying to please everyone—only to realize I just need to focus on few things to give my best and let go of the rest."

Q: Can you recall any interesting twists and turns?
This is not unique at all, but I used to take guff for things one should be proud of very personally—"you're overqualified," "you're too organized," "you get too much done," "your art is too good/expensive," "you're too accomplished," "you're too professional," or "you're too nice"—which really kept me from doing what I wanted to do.

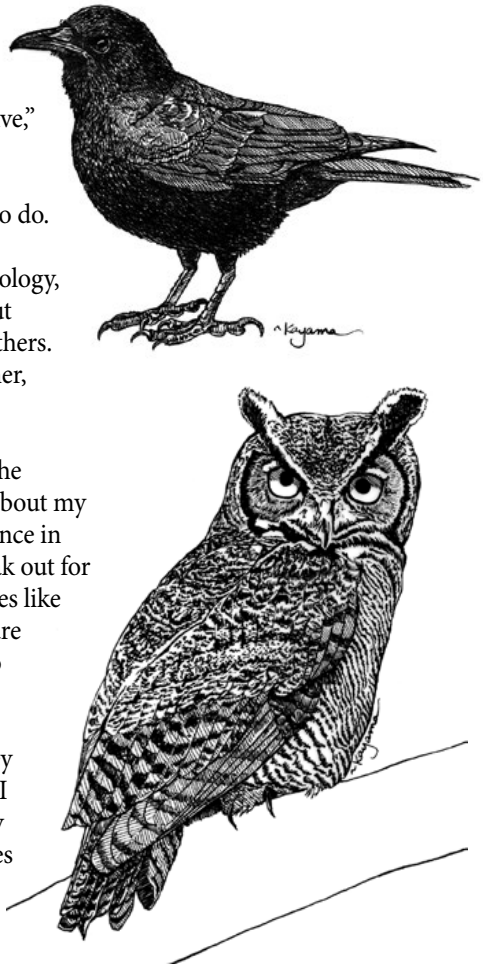
Now that I've read up on behavioral psychology, I've accepted that humans tend to point out what they don't like about themselves in others. So they aren't really talking to me, but rather, talking to themselves at me.

Somewhere along the way I got bitten by the perfectionist bug and I get crazy anxious about my illustration work. I also looked for acceptance in wrong places/people. The only way to break out for me is to create more art. I like art challenges like Inktober, 100 People 5 Days, Art in 1 Square Inch, etc., just to get out of the funk and to rebuild confidence in my art.

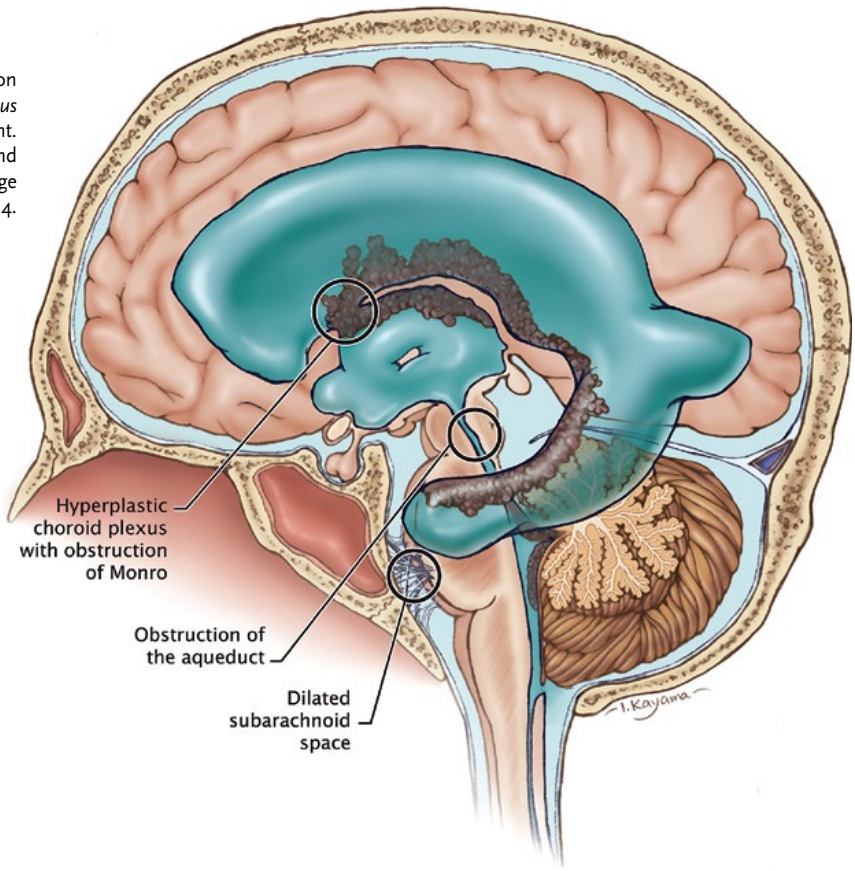
So I have made a long and winding journey trying to please everyone—only to realize I just need to focus on few things to give my best and let go of the rest. It's great! It leaves me time and energy to do other stuff like running and sketching.

I've been very fortunate that I am able to surround myself with quality clients. One time I was involved in a long-term group project that involved multiple trolls. Even though everyone was working towards the same goal, the trolls did a lot of things that were counterproductive and divisive. Even though the project meant a lot to me and I invested a lot of time, I had to get myself out. That was one

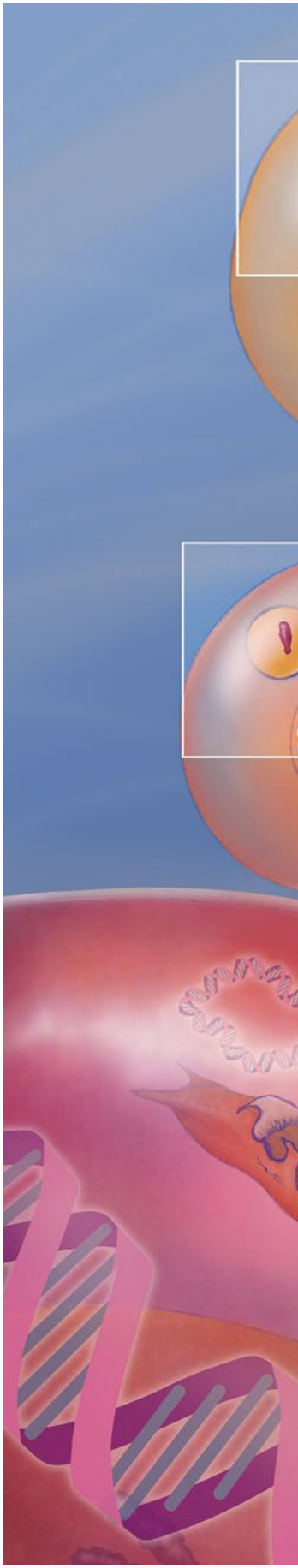
[1] *Corydoras* is genus of freshwater catfish commonly seen in aquariums.



Above: Two ink drawings created for Inktober 2019. (*Top*) Fish crow. (*Bottom*) Great horned owl. Pen (Esterbrook #128 Extra Fine Elastic) and ink (Winsor & Newton 951 Black Indian Ink) on vellum (Clearprint Heavy Vellum 48lb/180gsm).



Right: Cover illustration for *Adult Hydrocephalus* ed. Daniele Rigamont. Adobe Photoshop and Illustrator. © Cambridge University Press, 2014.



of the best decisions I made. I learned a lot about leadership and management. After that incident, I knew what sort of projects were a better fit for me, and how to read and work with those who may become a tormentor in a groupwork setting.

Q: What was your training?

I went to a magnet school that offered an International Baccalaureate (IB). Looking back, it was very strange that we didn't have a proper biology teacher for about half of the time I was there. Many years later, I found the same biology textbook we used on display in the Royal Ontario Museum in Canada. The item on display was from Cobb County where I was from and even had the familiar bright yellow sticker on the cover that read, "Disclaimer: This textbook contains material on evolution. Evolution is a theory, not a fact, regarding the origin of living things. This material should be approached with an open mind, studied carefully, and critically considered."

I went to the University of Georgia for my undergraduate. Starting each year with band camp, I made wonderful friends from all different fields of study. The head of the art department at the time seemed like an unhappy person announcing often that most everyone will fail as art majors and that everyone should become art historians or educators.

General art major was how I filled out my intended major. My plan as an 18-year-old was to become a Disney animator and work at their studio in Paris or Florida. Just after my first semester in college, Disney animation reorganized to create mostly 3D animations. Some of my favorite things about the Disney animation was how the hand-drawn lines look so lively and that the watercolor backgrounds have so much depth.

"I met Elaine Hodges once, and she was so friendly and patient even for a lanky, exhausted but energetic college kid like me."

I had to draw with my hands. With that, I discovered that scientific illustration was offered as a major. Studying under Gene Wright, I had the best time rolling on the ground drawing plants, checking out bird skins and skull specimens from the natural history museum on campus, and drawing insects under microscopes. Gene covered all techniques—graphite, pen/ink, watercolor, Photoshop, Illustrator, and art of business. I remember the late nights working at the studio, the computer lab, and the

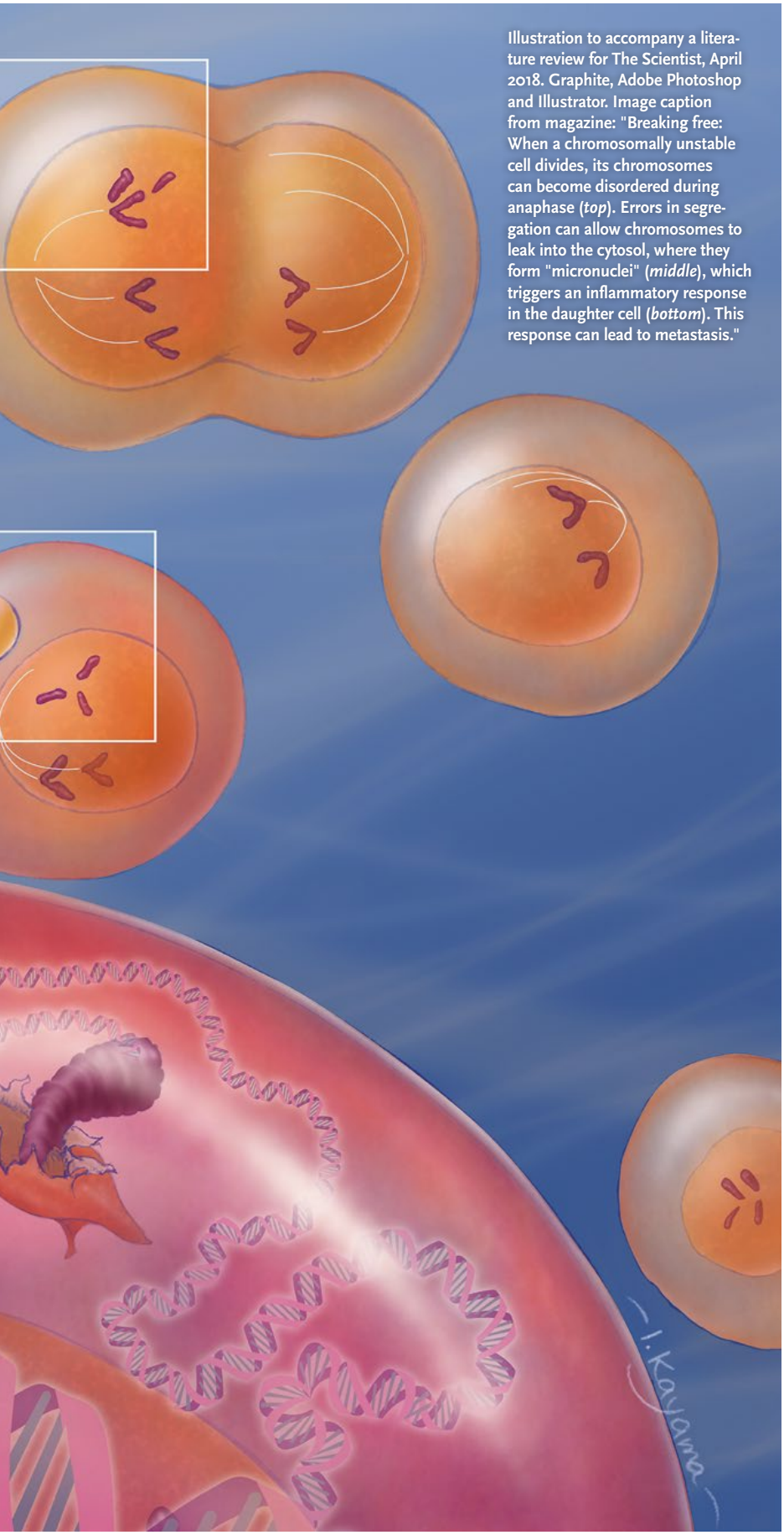


Illustration to accompany a literature review for The Scientist, April 2018. Graphite, Adobe Photoshop and Illustrator. Image caption from magazine: "Breaking free: When a chromosomally unstable cell divides, its chromosomes can become disordered during anaphase (*top*). Errors in segregation can allow chromosomes to leak into the cytosol, where they form "micronuclei" (*middle*), which triggers an inflammatory response in the daughter cell (*bottom*). This response can lead to metastasis."

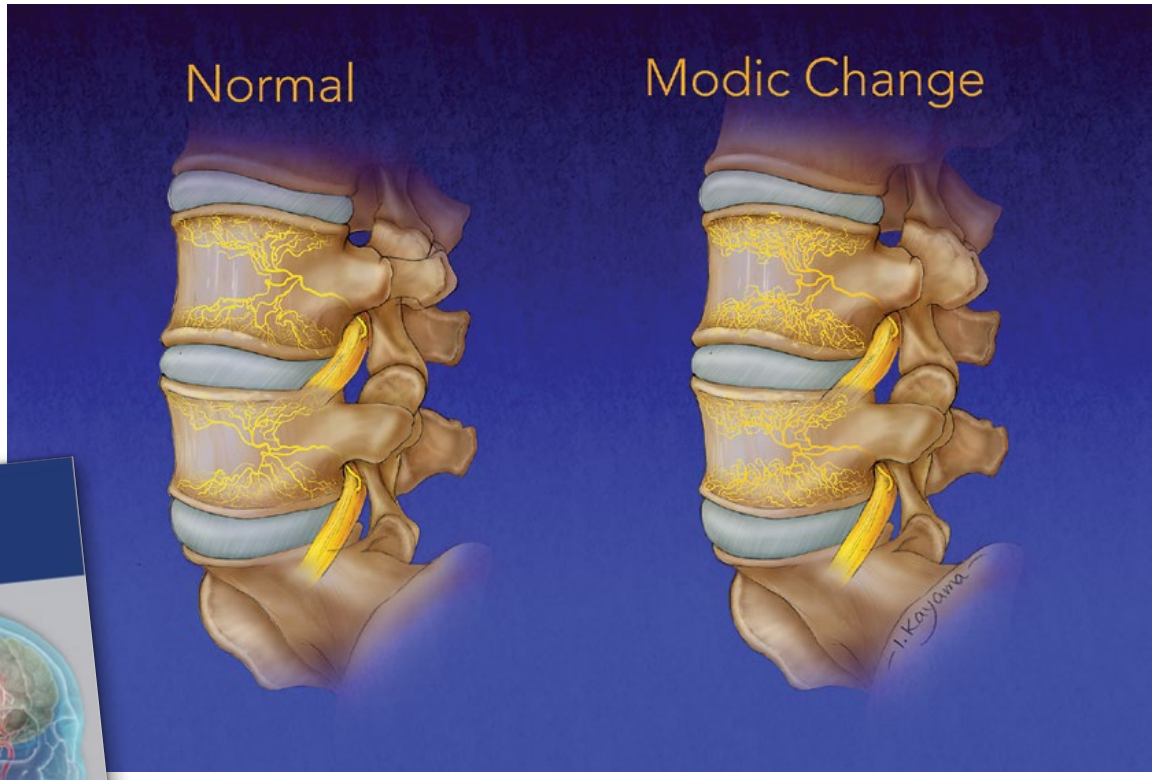
herbarium. I called it the scientific illustration monastery, but no one else did. We also had to study for the science courses such as human anatomy and physiology and comparative vertebrate anatomy. I got to study from human dissections for the first time in anatomy and physiology, and I was fascinated.

Along the way, Gene told me about medical illustration and graduate programs. What a great way to connect my past struggles in healthcare and give back to those in need! I was excited to apply to all of them. First time, none of the schools accepted me as my figure drawings were not good enough. I took a year off after graduating, went to as many figure drawing classes as I could while working odd jobs. Fortunately, on the second try I was accepted into all programs I applied to.

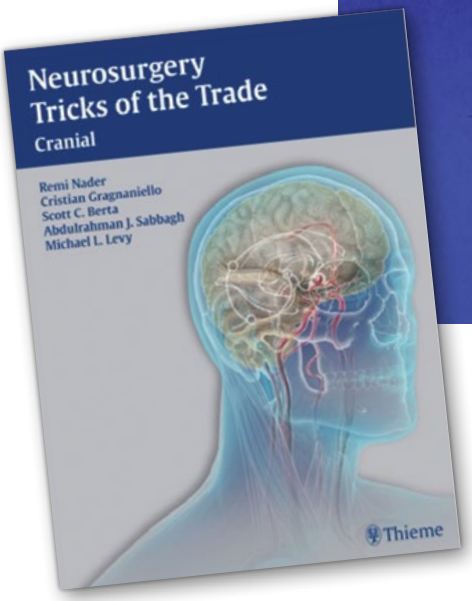
Right after college, I went up to my first GNSI conference in Bar Harbor, Maine. I could not believe that I was taking classes from luminaries and legends such as Trudy Nicholson and John Cody! It's incredibly rare to have such a supportive, professional group. I met Elaine Hodges once, and she was so friendly and patient even for a lanky, exhausted but energetic college kid like me. Everyone was so welcoming and I was hooked.

I went through the Art as Applied to Medicine program at Johns Hopkins University School of Medicine and earned my masters. It sounds fine and simple, but it was a grueling two years of constant studying, drawing, redrawing, fixing, reading, and sometimes sleeping. I stayed until the last shuttle on most weekdays drawing and painting at the studio. I remember lonely nights in a room full of cadavers sketching and studying. I found a perfect underground dungeon at the undergraduate campus library and reading/studying anatomy for hours. It was the most quiet place in Baltimore. There was a café on the ground level and I would come up every once in a while to enjoy the sun, green grass, and a nice caramel latte. The medical library on campus had amazing rows of stacks with perfect north-facing cubbies to spread out all the books, index cards, and sketchbooks.

With the degrees under my belt, I completed an internship at the Smithsonian Museum of Natural History with Marie Metz, who was an illustrator in the entomology department. After that, I went to New York to illustrate fossil turtle skulls with Frank Ippolito at the American Museum of Natural History. When I was there, I don't think I appreciated the amount I learned from them, not just the techniques but being a professional illustrator working with researchers.



Right: Nerves inside the vertebral bodies comparing normal anatomy and modic change. Graphite, Adobe Photoshop.



Above: Neuroscience textbook cover. Adobe Photoshop.

I've been freelancing and working as a contractor with various companies and organizations as a medical and scientific illustrator ever since. It's been an adventure to say the least, but I am proud to have what I have built for myself.

Q: What was your first break?

I was over the moon when I got my first textbook contract doing a few chapters for $1,300. Being paid for my art instead of paying tuition to paint was a novelty. Beginning in 2012, I co-illustrated a 2-volume textbook on neurosurgery and they let me illustrate the covers. Ever since then, I've gotten a lot of academic neurosurgery publication projects. Oddly enough, the textbook authors found me for one illustration I did in school. No one in the program liked the drawing, but the authors loved it. The lesson is that people have different tastes and different needs.

"I'm always grateful working with all kinds of amazing researchers and educators from around the world."

Q: Where are you in your career?

I still feel like a novice and learning constantly, but I have managed to divide and focus my business into three branches to diversify and to create a profitable business. The three branches are: production, workshops, and print sales/licensing. They end up marketing for each other and that's been a huge time saver and keeps me from the monotony of sitting in front of the computer drawing the same thing all day.

Q: What are your career goals now?

I'd love to give more talks and workshops overseas. I would also like to spend more time with birds in their natural habitat. Business-wise, I need to write more about medical and scientific illustration.

Q: How do you promote your freelance work?

I freelance full time! It's an adventure keeping up with contracts, proposals, invoices, promotion, etc., not to mention keeping up with the production schedule. I'm always grateful working with all kinds of amazing researchers and educators from around the world.

I like to treat it as a numbers game and to not take things too personally. If an agency picks another artist over me, I just go look for another one. Working a booth at an art festival is a good way to visualize prospective customer conversion rate. Working online can make the marketing and sales process more abstract and agonizing.

I have a website, *studiokayama.com*. It generates fair number of leads. I would do more if I could get that perfectionist bug off me. I also like to post my illustrations on Facebook, Twitter, Instagram, and LinkedIn. Staying off their analytics page is the challenge for me as I love compiling and comparing data.

In-progress shot of a northern saw-whet owl. Watercolor on illustration board.

Q: What are your current projects?

I'm usually working on several projects at a time. I'm working on a surgical procedure series showing surgical approaches and conceptual illustrations for an endonasal scope to access to the atlanto-odontoid joint. Another on the drawing table is the Adamkiewicz artery which runs along the spinal cord and joins with intercostal arteries to feed the thorax and lumbar tissues.

I just finished a piece for the *American Woodworker Magazine* showcasing the backbone and the nerve roots that may be injured when woodworking. The author is a retired surgeon who is also a woodworker. Also hot off the press is a dinosaur piece I worked with a scientist in Canada.

Lastly but very excitingly, I'm working on a commemorative series celebrating 100 years of bird banding. Painting birds is one of my absolute favorite things to do, but it's also absolutely horrifying to paint for master bird banders who know each and every feature of each bird species to identify species, sex, and age in all seasons.

Distinguished Service Award: Ikumi Kayama

Ikumi is the principal medical and scientific illustrator of Studio Kayama specializing in illustration, animation, graphics, and web design. She holds an MA in Medical and Biological Illustration from Johns Hopkins University School of Medicine and a BA in Scientific Illustration from the University of Georgia. Her work has appeared internationally in juried shows, exhibits, textbooks, scientific journals, magazines, presentations, television shows, educational apps, and websites. Ikumi is the recipient of many awards from a variety of organizations including GNSI, Illustrators Club, and AMI. Her distinguished achievements include:

- Serving as GNSI's Vice President from 2016 to 2018
- Serving as GNSI's Recording Secretary from 2010 to 2016
- As a member of the DC Chapter, organizing a Chapter Group Exhibit in 2014 and helping to organize a 3-day workshop in 2017.
- The 2015 GNSI Special Projects Award for a organizing and executing a Membership Survey.
- Facilitating video recordings workshops of GNSI legends Nancy Halliday and Trudy Nicholson at the 2014 Boulder Conference for our archives.
- Serving as Digital Coordinator for Conferences in 2009, 2010, 2013, and 2014.
- Presenting workshops and presentations at conferences almost every year from 2009 to present.

As Vice President, Ikumi built on the work of past conference planners to design a new management system for conference planning. She defined all 20+ volunteer positions and their responsibilities on the committee, provided templates and examples, established a Basecamp online office space for the rotating conference planning committees to communicate and share their work, and synced the schedules of each volunteer in one master schedule. Increased transparency and delegation led to:

- A reduction in volunteer drop offs: we only lost 1 in 2017 and 0 in 2018
- The conference committee return rate jumped from 5–10% to 50%
- A revised budget introducing more benefits for attendees and perks for conference organizers
- Better communication between GNSI and third parties (field trip locations, campus staff, etc.)
- High attendance and approval ratings of the 2017 and 2018 conferences, which raised over $50,000 for the Guild.

Ikumi's efforts to restructure conference planning gave the GNSI Board more time/energy/space to do other projects, which led to:

- Assisting the Board as they met in Washington DC for a 2-day strategic planning meeting—where the conference was no longer identified as a problem area for the Guild.
- Working with Diana Marques, Daisy Chung, Deb Shaw, and Linda Feltner to research, organize, and update the GNSI website. Ikumi researched various web-building options, catalogued all 600+ Guild web articles, helped with editing/migration, and set up initial templates.
- As Vice President, Ikumi created a "Conference Location Application Worksheet" for potential conference chairs which guided the Conference Oversight Committee (COC) when vetting future conferences. To empower committee members and improve communication, Ikumi published conference registration policies, and embedded COC members as mentors in each of the four teams of the Conference Planning Committee.

Ikumi is most proud of her work to identify problem areas and to fill in the gaps to better support the volunteers. She couldn't have done it without enthusiastic support from the conference committees and the volunteers who have given her feedback, questions, and suggestions to make the new system even better.

The Antarctic beech (*Lophozonia moorei*) are Gondwana relicts in the World Heritage rainforests in Springbrook National Park, Gold Coast Hinterland of Queensland. © Sara Taliaferro

Conference Review: *Brisbane*

— *Sara Taliaferro*

Every moment in Australia this summer was a dream come true. For Guild members who did not make the long journey, it is difficult to do justice and honor to the experience or to adequately thank everyone who played a role in envisioning and realizing this international conference. Therefore, ultimately, we will not leave it to my voice alone but continue to share the stories of science and nature and creativity and place as told by many voices. In the meantime, I offer this preamble.

The Queensland Women's College was our housing and session host for the conference. Dorm life is quite a different thing when one gets wine breaks before dinner, dim sum for Sunday lunch on Board Meeting day, and meals in the great hall or on the terrace. Every delightful and gracious person who works at the College, from security to the Matron at the dining hall, made us welcome and cared for us well. Thank you.

We simply would not have managed the conference without the expertise and work of Sally Brown Conference Connections. I am particularly grateful to Sally and her team for their grace in handling the rather complex event we do bring to town when GNSI gathers for its Annual Meeting and Conference. Thank you.

In addition to our prestigious North American representatives, I would like to particularly acknowledge Australian representatives from the University of Newcastle, the Royal Botanic Gardens in Sydney and in Melbourne, the University of Melbourne, the Wildlife Art Museum of Australia, Perth Children's Hospital, Botanical Artist's Society of Queensland, Medical Illustration at the Royal Melbourne Hospital, University of Western Australia; and, especially, express appreciation for students from diverse locales including the University of Tasmania, the University of Newcastle, and the University of Queensland. I believe we will maintain these newly-forged connections over oceans and over time. Thank you.

The conference itself held the content we have come to appreciate: presentations showcasing top industry trends and the highlighting of members' roles in collaborating with researchers, museums, conservation groups, and public health officials to visually communicate to, and emotionally connect with, a larger audience.

Australians! Wow! Amazing artists and scientists, uncompromisingly good, highly-developed and strong in their images and expertise—I am humbled. I now believe that every Australian scientist and naturalist is a consummate public speaker, is equipped with a clever sense of humor, and shares a boundless enthusiasm and energy for their life's work.

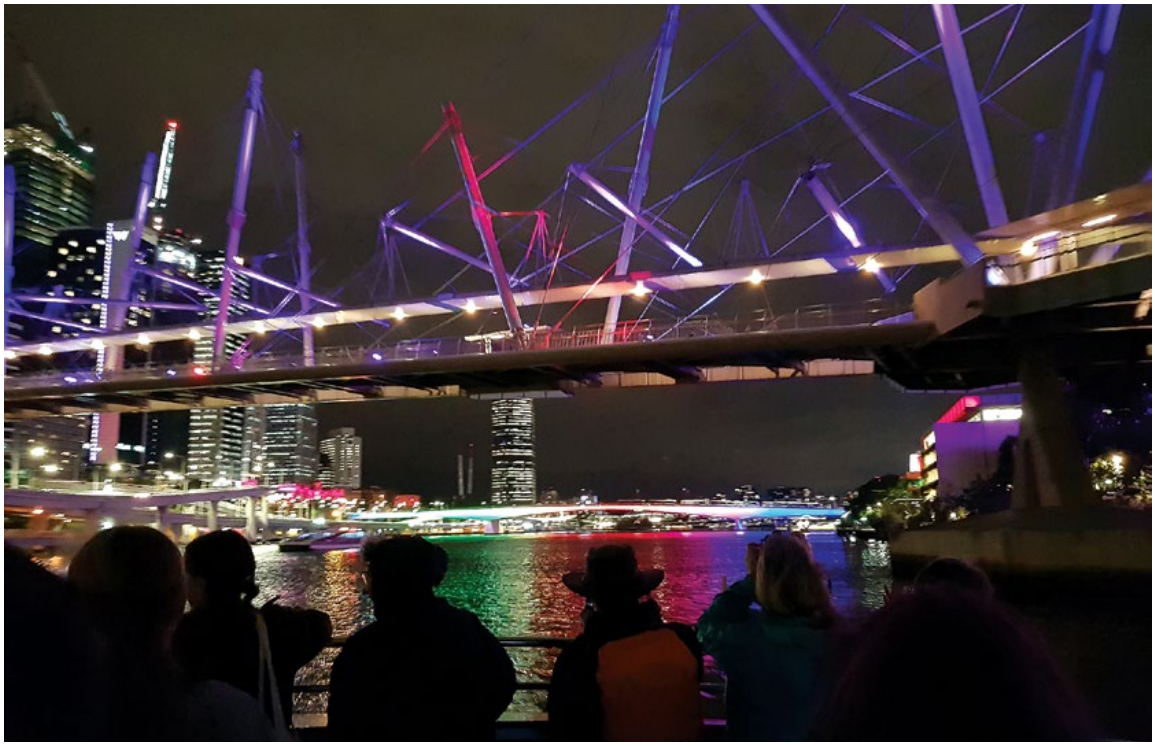
"I now believe that every Australian scientist and naturalist is a consummate public speaker, is equipped with a clever sense of humor, and shares a boundless enthusiasm and energy for their life's work."

I was particularly taken with the lively intellectual challenge of Tim Low's presentation. This notable biologist, through his seventh book, *Where Song Began: Australia's Birds and How They Changed the World*, became the first-ever nature book author to claim an Australian Book Industry Award. Turning a persistent North American bias on its head, he made a compelling case for the now more widely accepted idea that Australia provided the world with its songbirds and parrots, the most intelligent and ecologically powerful of all bird groups. "Australia has such unusual mammals that they have long cast a shadow over something of equal distinction, the birds. These stand out in so many different ways—in ecology, behaviour, evolution, and biogeography—that we can learn more about Australia from its birds than its mammals." As with Australia's unusual mammals, Australian birds evolved through tens of millions of years of isolation after the continent broke off from Gondwanaland.

I was equally captivated by Cardoso's discussion of her work as an artist and model maker. Granted, as someone who has spent countless hours sketching and inking drawings of insect genitalia, I cannot tell you the geeky delight with which I discovered that an artist had created a very highbrow series of 3D sculptures of what I had often myself described as sculptural works of art, albeit to a much smaller group of enthusiasts than did she. Besides, anyone who truly launched their career with a flea circus is worthy of my unabashed enthusiasm.

All manner of pleasure was garnered from Wilson's Australian Reptiles, complete with surprising discoveries made along a pipeline trench. Or Monteith's sharing of the compelling story of *The Butterfly Man of Kuranda*, and images of his theatrically presented meticulous displays of butterflies and insects. Or McKay's thoughtful narrative on the life and art of botanical artist Ellis Rowan. I ate up the stories of Australian naturalists and scientists and artists. I confess, I had some

Above: (*top*) Crimson rosella (*Platycercus elegans*) at O'Reilly's Rainforest in Lamington National Park. (*bottom*) Koalas (*Phascolarctos cinereus*) at Lone Pine Koala Sanctuary. © Sara Taliaferro



Right: Cruising down the Brisbane River on a CityCat ferry, en route to the exhibit opening at Queensland Museum. The Kurilpa Bridge is lit up in US colors to celebrate 4th of July. © Geoff Thompson

skepticism over an Australian who created a map of North America, but I decided to humbly swallow my doubts. And once I actually heard Anton Thomas's rather playful and detail-oriented tale of careful research and painstaking years of copious details, complete with arduous re-inking and re-doing of entire sections, I was entirely willing to accept him as one of our own, even to the point of forgiving him for the baffling and unfortunate placing of a skunk in the graphic depiction of the state of Kansas.

Above: John Norton showcases beautiful botanical art at the Annual GNSI Conference Auction; proceeds support the GNSI general fund and educational fund. © Britt Griswold

GNSI's all-digital Annual Exhibit at the Queensland Museum was awe-inspiring. The art and infographics and diagrams that shone forth were created in various ways, through brush or pen on paper or with stylus or finger to screen. But all were projected, larger than life, on a huge banner-style kiosk above our heads and then again on a luminous screen in the auditorium. Our conference chair, Geoff Thompson, and GNSI Vice President Amelia Janes curated and uploaded the Exhibit. We owe special thanks to Geoff, not only for the countless hours he spent ensuring that the exhibit would flawlessly unfold before our eyes during the opening, but for being our ambassador to our unparalleled exhibit hosts and conference contributors, the Queensland Museum. The Queensland Museum, after thoughtful deliberation, donated the entire exhibit opening space to us, complete with security. This is a great and deeply appreciated gift. We value the community of researchers and staff who carried out this mission in the heart of downtown Brisbane, and it was a privilege to be a part of that.

I also wish to share the joy of proper tea breaks complete with warm scones and jam and clotted cream; the wonder of waking to the cacophony of bird calls and cries each morning, so exotic to my North American ear (THAT is an actual kookaburra, laughing!!); the endearment of seeing a hundred or so odiferous, munching, napping, hopping koalas in the Lone Pine Tree Koala Sanctuary (whilst receiving texts from my teen from thousands of miles away, warning me of chlamydia); that peculiar delight a natural scientist can take upon discovering wombat feces are indeed cuboidal; the excited, unphotodocumented potoroo sighting; complex wondering emotions while viewing a blue bowerbird's artfully arranged bits of humans' azure and bright blue plastic litter, designed to woo a mate; of hearing the wind blow mist through a rainforest in the mountains in sighs and occasional low roars; on hearing the rapping calls of lawyer birds echoing through the trees, or listening with a chill down my spine to a young lyre bird practicing its call; the great reverence experienced with a small cluster of kindred spirits huddled under umbrellas, soaking in the ancient majesty of Ent-like Antarctic beech trees; or on being an infinitesimal speck bobbing about, awestruck, in the rough waves of the Pacific Ocean above a panorama of color and life in a surviving section of the Great Barrier Reef. And all of these

The Annual Awards Banquet. © Sara Taliaferro

Above: (*left to right*): Vice President Amelia Janes, President Sara Taliaferro, and former President Linda Feltner at the Annual Awards Banquet. © Sara Taliaferro

experiences happened in a light and an atmosphere of a notably different clarity, decidedly unique compared to my own outdoors on another continent.

Part of the great difficulty in writing this article, if I am entirely honest, is that the pressing nature of communicating the value of science and the critical need for a healthy natural world to sustain life on our fragile planet—and our own urgent need for collaboration and connection in a community of people who value this work—is inescapable, and the crises and threats are mounting. Since the Brisbane conference, our Australian counterparts have witnessed huge swaths of Australia's coastal rainforests burned in epic wildfires. Areas of unparalleled natural beauty in the forests and along the coasts, including places of significance to indigenous people, are destined for the bulldozer and human development.

Equally distressing, the University of Newcastle's School of Creative Industries recently rather abruptly shuttered the Natural History Illustration degree. They have announced that no new admissions will be taken into the program. This degree program is arguably unique, one of the broadest and most comprehensive scientific illustration courses in the world. "At a time when communicating scientific research has never been more important, the specialized forms of observation and illustration that are taught in the degree produce highly skilled graduates who help people to understand the natural world and care about it," wrote members of the Natural History Illustration Club. I was astonished to hear that the online Natural History Illustration course, designed by staff of the Natural History Illustration degree, had over 93,000 enrollees from all over the world.

It is paramount that we help each other envision a coordinated network of actions, artistry, and mentoring—to shift the course we are taking in this Anthropocene era. It is essential that we give witness to what is still beautiful in this world. Although advocacy is not part of the mission of the GNSI, we can all share visions of what we would like to happen in this world and focus on those intentions, using them as a guide for our collective actions with allies.

To everyone who attended the conference, well met! And thank you for showing up to share in and celebrate the visual work we do to showcase our connection to life on this planet.

Interested in attending the 2020 GNSI Annual Conference?

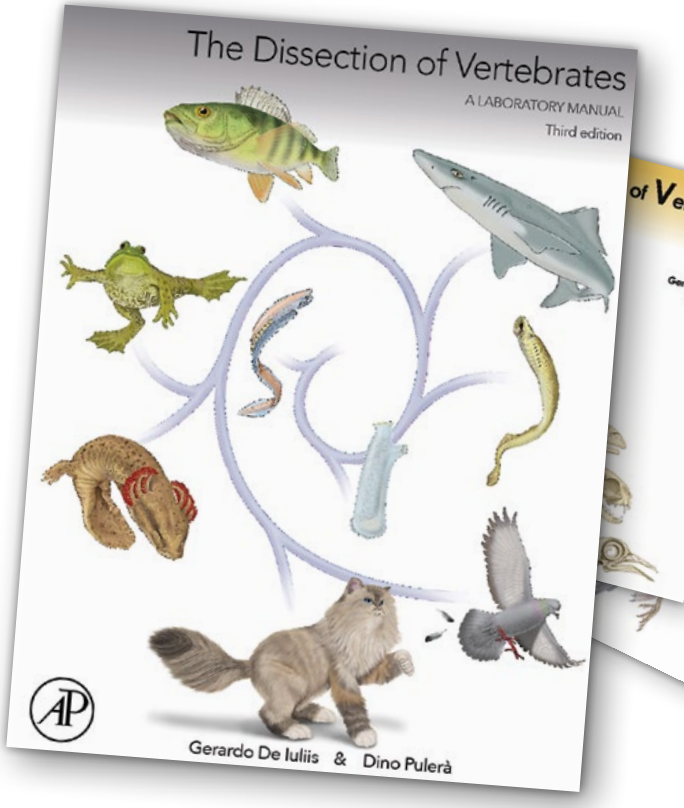
This year we'll convene at the University of Utah in Salt Lake City, July 5th–11th (*see back cover for our Save the Date*). Keep a look out for the Conference Committee's 8-page bulletin, which will be mailed to all members soon. The bulletin will share exciting tidbits about the upcoming conference, including more information about the setting, what to expect (if this is your first conference!), and guidelines for this year's Members' Exhibition, *Nature's Palette*. The conference website *gnsi.org/2020conf* will be updated regularly leading up to the main event.

Interested in sharing your expertise or demonstrating a technique? There is still time to submit a proposal! Send us your ideas at *form.jotform.com/93007415973156*. Submissions are due by February 13th, 2020.

A Short History: The Dissection of Vertebrates

— *Dino Pulerà*

This is a personal account of how a scientist (comparative anatomist and paleontologist) and artist (scientific and medical illustrator) have worked together for over two decades to create The Dissection of Vertebrates: A Laboratory Manual, *which has had the good fortune of being in print for the last 12 years and is currently in its third edition. The path to achieving any measure of success has been anything but smooth and easy. This brief history will discuss how and why this book came to be and the key features that set it apart from the competition and have warranted three editions. The success of this volume also stems from the teamwork between a comparative anatomist (primary author) and scientific illustrator (co-author) with a shared passion for comparative vertebrate anatomy and a common goal for communicating it to a wide audience using their individual strengths.*



Above: Covers of the new third edition (*top*), second edition (*middle*), and first edition (*bottom*) of *The Dissection of Vertebrates*.

The story begins in 1991–1992 when I was in undergrad taking a comparative vertebrate anatomy course at the University of Toronto. This is when I met Gerardo (or Gerry) De Iuliis, who was a vertebrate paleontology PhD student and one of the TAs for the course. Gerry and I quickly became friends because we had so many things in common besides an interest in comparative anatomy. He also noticed that I liked to sketch my dissections in lab and asked if I'd be interested in creating some illustrations of fossil giant ground sloths, the subject of his research. I wasn't formally trained in art but I did like to draw as a hobby and I liked the subject matter, i.e. anatomy and paleontology. This was before I knew that I wanted to become a scientific illustrator. After graduating from the University of Toronto's Biomedical Communications program in 1996, I continued to create illustrations for Gerry. One evening in 1997 during a sketching session in his office, Gerry lamented over the limited options for vertebrate dissection manuals. Gerry had recently taken over the teaching of the course at the University of Toronto and was looking for a suitable manual and couldn't find one. The existing lab manuals were either in combo textbook and lab manual format, or a list-style format. While the former met his needs and probably those of other instructors teaching the same course, they were problematic for students. When using these manuals in the lab students got so bogged down with the superfluous information that dissection directions were unclear and students were uncertain about the material for which they were responsible. As for the list-style manuals, students often became confused because of the brevity of dissection instructions. So Gerry nonchalantly asked if I'd be interested in teaming up with him to create a dissection manual. I thought it was a great idea and eagerly accepted his invitation. We put together a proposal package with sample illustrations and sent it out to various publishers in the summer of 1998. Unfortunately, we didn't receive a single response. We revised our proposal and targeted a different group of publishers in the spring of 1999.

Here is an excerpt from our proposal, which also appears in the preface:

The main goal of this text is to provide today's visually-oriented student population with a manual that links succinct and pedagogically effective textual direction with relevant, accurate, and attractive visual references to promote efficient learning of the complex, spatially

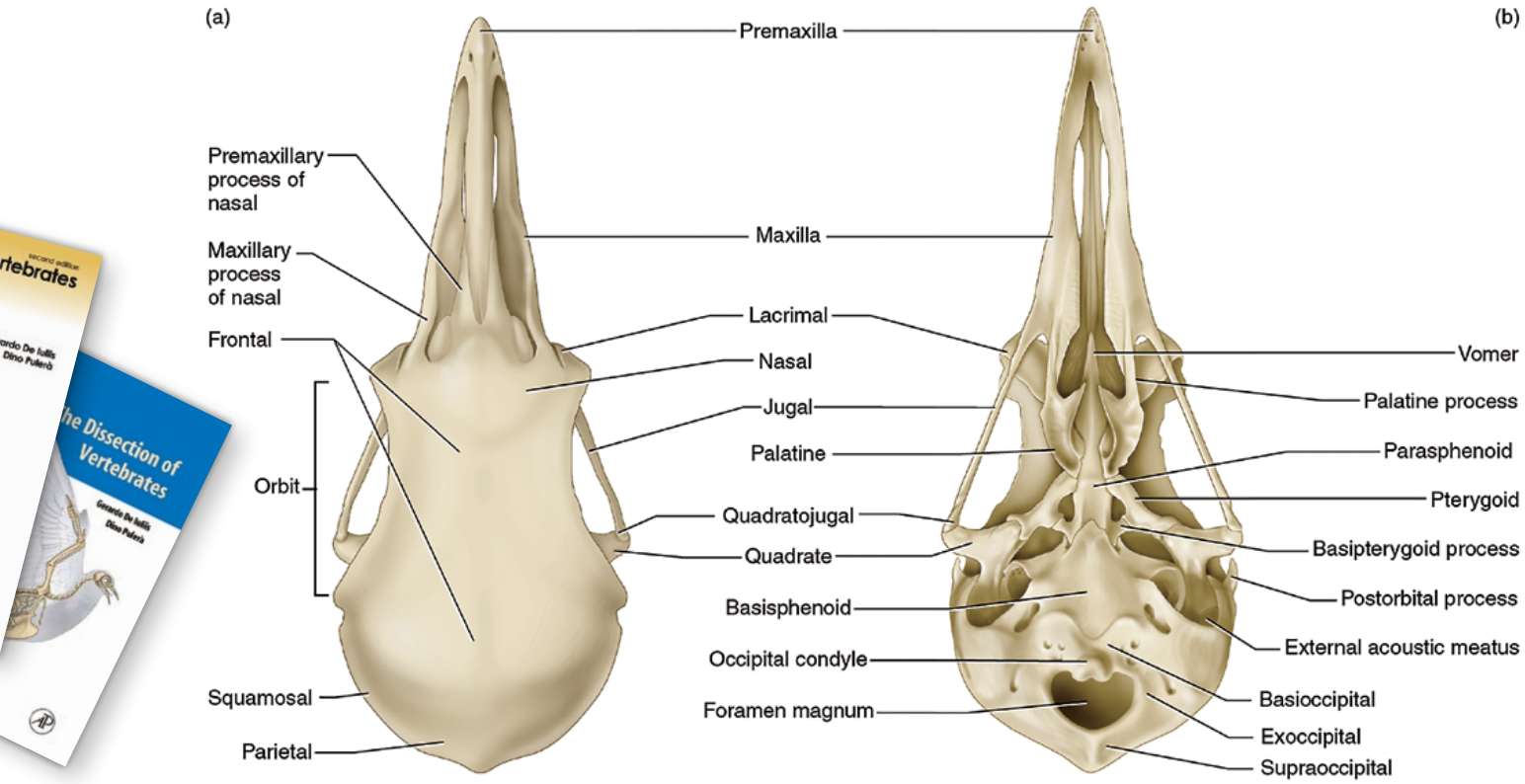


FIGURE 9.2 Skull of the pigeon in (a) dorsal and (b) ventral views.

abstract subject matter in the limited time available in a laboratory setting. Thus, a critical feature of The Dissection of Vertebrates *is the inclusion of numerous high-quality, didactic, color illustrations. Each depicts the vertebrate approximately as it would appear in a particular stage of dissection, rather than presenting an idealized figure or photographs, as is the case for most other manuals. This in itself facilitates the use of these illustrations, both in learning and later during recall for studying purposes. Photographs are used sparingly. We have chosen illustration over photography in the vast majority of cases because illustration is the method that affords the most control in communicating the pertinent features of a particular dissection. Photos are objective and indiscriminately record what the camera sees, whereas illustrations (or rather the illustrator) can be subjective, selective, and interpretative with the ability to omit unnecessary details and emphasize anatomy important to the purpose of the dissection.*

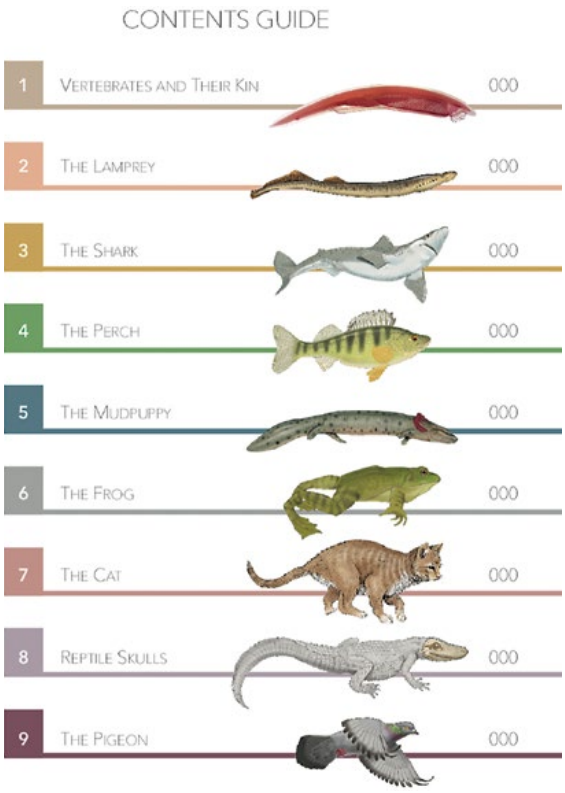
Coincidently at this time, Gerry and I were both working for a studio that produced visuals for science textbooks. We naively thought it wouldn't take too long to complete a book because we both had some experience in the publishing industry, Gerry as an art and content editor and I as a textbook illustrator. So when we finally signed our book contract in late 1999 and the terms were to complete the book in two years, it seemed reasonable. We also agreed to these terms because we had only one interested publisher and we didn't want to pass on this opportunity. Little did we know that creating a book from scratch in two short years was completely unrealistic. For more information regarding the production of this book see JNSI 2018: 50(1):21–25.

To save time, we decided to use photos wherever possible and were hoping to perform minimal dissections and modify existing published illustrations to make them new and different—this was, after all, what we did at work every day for other textbooks, so it seemed like a straightforward plan. But when Gerry started to proof my illustrations he found numerous errors. When he compared my illustrations to the references I was using he began to notice that many of the references were inaccurate and erroneous. So we had to scrap our simple plan and start from scratch. I guess this is how Vesalius must have felt when he created his own great tome on anatomy! Gerry immediately started performing extensive dissections, which were very time consuming. We met once a week. Gerry would show and explain his dissections and I would take videos and photos. I didn't have the luxury of time to dissect

Above: Skull of the pigeon, *Columba livia*, in dorsal and ventral views.

or sketch in the lab so I had to work from videos and photos at home; it may have been comfortable, but it was far from ideal, as I had to work without the benefit of access to the material. At the time we could not afford digital photography equipment, so every week my photos had to be developed and printed. I would make notes on the back of each photo to help me remember its contents, which was especially important because I wasn't going to illustrate some of these dissections for months because there was such a backlog.

It's not surprising that at this snail's pace we weren't going to meet our deadline, so we requested an extension. We were given an additional year to complete our book. Even with this extra time we struggled because we were working on the book part time, i.e., weekends and evenings. We were probably working about 80 hours a week between our full time jobs and the book. Even at this pace, we struggled to meet our extended deadline and we sheepishly requested another extension, which the publisher granted. Then one day out of the blue in the summer of 2003, with the book more than 75% complete, our publisher canceled our contract because the book was taking too long to complete and the impression that the market for our type of book was dwindling. Gerry and I were caught completely off guard. We were devastated but, oddly enough, also relieved. This project had been so incredibly stressful and consumed almost every aspect of our lives. This unexpected situation gave us a much needed reprieve. We took a few months off to relax and regroup before contacting a batch of new publishers in the fall of 2003. We reached out to a half dozen publishers but only one was interested. We signed a new contract with Elsevier in the summer of 2004 with the expected delivery date of spring of 2005. By this point we were making great progress and on track to finally meet our deadline. Just when we could see the light at the end of the tunnel, our book was sent out for review. Feedback was very positive but some reviewers thought the book needed additional content and we were given another extension to produce the new material. Finally, in the fall of 2006 the book was published, but before we could actually hold the finished product, we received a call from our publisher informing us that the shipment of books heading to the US from China all had to be destroyed because the printing house put on the wrong binding. So it wasn't until the spring of 2007 when we finally got to see and hold our book.



Above: General overview of the contents of the book.

Fortunately, our book sold relatively well for its market share and within a year Elsevier contacted us to see if we would be interested in a second edition. Despite the many challenges we had faced in the past, we welcomed the opportunity because we were so pressed for time when we produced the first edition that we inevitably made mistakes, introduced inconsistencies, and left out content. This was a chance to make revisions, add more content, and create an improved and more competitive book. Two of the major additions for the second edition included comparative skull sections for mammals and reptiles and the musculature for the mudpuppy (*Necturus*). The publisher agreed with our plans. We signed our contract in spring of 2009 and the second edition was published in the winter of 2010.

In 2011, Elsevier contacted us again to gauge our interest in a third edition. A shortcoming of the previous editions was that they didn't include any prevertebrates to complete the story of the evolutionary sequence of vertebrates. We agreed to a third edition because we wanted to include these chordates, expand the content for the other vertebrates, and make additional corrections and improvements. We drafted a proposal and signed a contract in the winter of 2012 with an expected publication date of 2014. The additions to the third edition were much more extensive and time consuming than we had anticipated. You would think that after two rodeos we would have learned our lesson! We hadn't planned to give the entire book an overhaul but the more we scrutinized our previous work, the more we wanted to revise and improve the existing content. The changes were as minor as repositioning leader lines a fraction of a millimeter to adding and replacing illustrations and photos, and to rewriting and adding new sections of text. Although such changes weren't initially in our plans, we couldn't pass on this opportunity, especially as we weren't sure that there would be future editions. It's not surprising that we needed an additional five years to complete this edition!

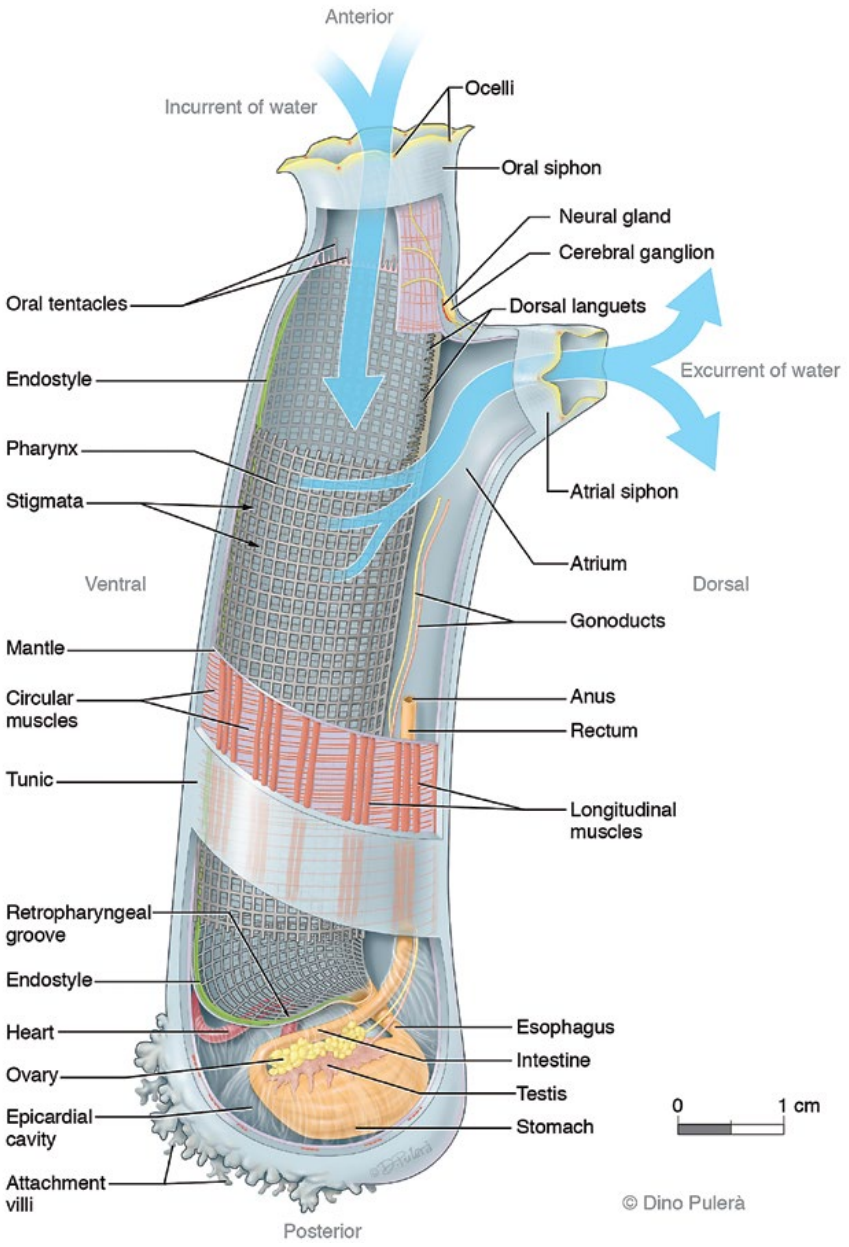
For this new edition, we added more content than the second edition, including two new prevertebrate

animals, the sea squirt (tunicate) and the lancelet (amphioxus). Gerry is a vertebrate anatomist so conducting detailed anatomical studies on these invertebrate chordates took considerable time. We both had to learn the anatomy and seek additional assistance from other experts in the field. Obtaining specimens also proved to be a challenge. The lancelet, which is a marine chordate that resembles a tiny finless skinned minnow, is much smaller than the specimens we are accustomed to studying. We had to learn how to use new equipment, techniques and technology not only to study them but also to image them. Performing detailed dissections on these tiny creatures is extremely difficult, so we used serial sections mounted on glass slides purchased from a biological supply company. We were fortunate to have access to very powerful light microscopes from the University of Toronto's Cell and Systems Biology Department that allowed us to capture the greatest detail possible. We took dozens of high resolution images for each slide and used a focus stacking technique to composite all the images into one. This technique focused the farthest and nearest structures with the same sharpness and also used the Photomerge function in Photoshop to stitch multiple cropped images together to reconstruct an image whole again from a single slide.

Another major addition was a detailed description of a mammalian heart. The heart of the domestic sheep is typically used in lab. We originally proposed to produce a simple overview of the sheep heart, but when Gerry performed many exquisitely detailed and beautiful dissections and uncovered so much amazing anatomy, we felt it would be a shame not to publish and share these images. We originally planned to produce about half dozen images but we ended up with 18 figures.

The introductory chapter was almost entirely rewritten to reflect the latest science on the evolutionary relationships of vertebrates and their kin. Almost all the cladograms (evolutionary trees) were revised and eight new ones created.

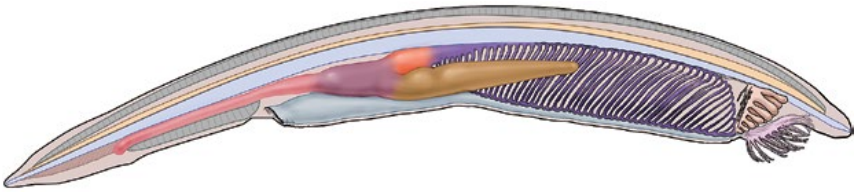
The cover for the third edition was also very time consuming. For the first two editions I recycled images from the book for the cover. But for this edition I created entirely new cover art, which I found challenging because I was creating animals in oblique view approaching the viewer and spiraling around a twisting cladogram. One of the important and unique features of our book is that it takes a systematic approach and follows an evolutionary sequence. Evolution is the foundation of all biological sciences and we wanted to incorporate the evolutionary relationships of the dissection animals. This is so central to our book that the book covers for each edition prominently include a cladogram.



Above: Cut away illustration of an adult sea squirt (*Ciona intestinalis*) in left lateral view, showing internal anatomy.

Once the manuscript and illustrations were submitted, I turned my attention to different ways of marketing the new edition. The publication of the new edition roughly coincided with Discovery Channel's Shark Week. I had some fun creating promotional material including a mock movie poster which Elsevier loved and used in its advertising of our book.

Below: Right lateral view of a juvenile amphioxus or lancelet (*Branchiostoma*); approximate length is 1 cm.



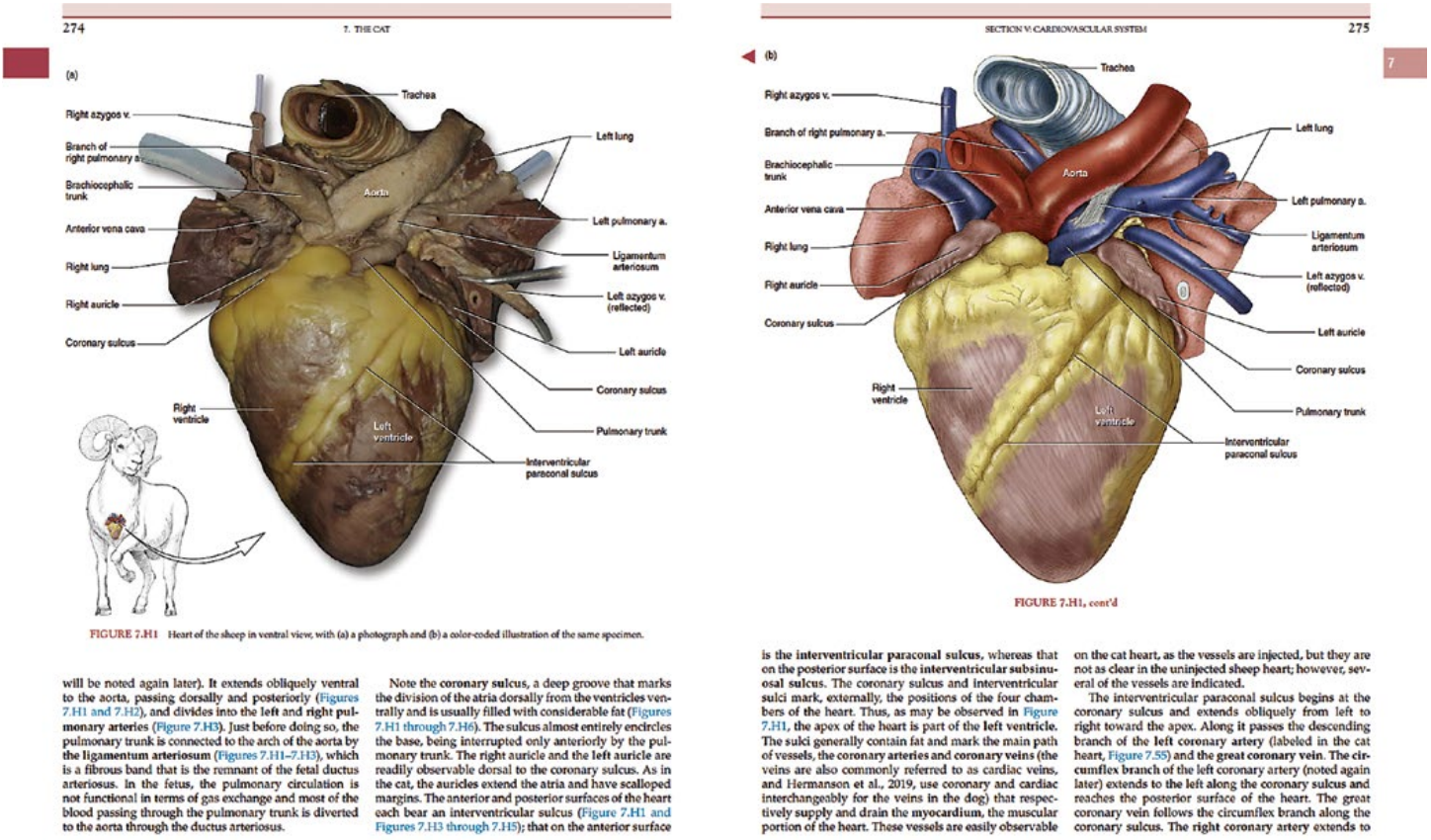


FIGURE 7.H1 Heart of the sheep in ventral view, with (a) a photograph and (b) a color-coded illustration of the same specimen.

FIGURE 7.H1, cont'd

will be noted again later). It extends obliquely ventral to the aorta, passing dorsally and posteriorly (Figures 7.H1 and 7.H2), and divides into the left and right pulmonary arteries (Figure 7.H3). Just before doing so, the pulmonary trunk is connected to the arch of the aorta by the ligamentum arteriosum (Figures 7.H1–7.H3), which is a fibrous band that is the remnant of the fetal ductus arteriosus. In the fetus, the pulmonary circulation is not functional in terms of gas exchange and most of the blood passing through the pulmonary trunk is diverted to the aorta through the ductus arteriosus.

Note the **coronary sulcus**, a deep groove that marks the division of the atria dorsally from the ventricles ventrally and is usually filled with considerable fat (Figures 7.H1 through 7.H6). The sulcus almost entirely encircles the base, being interrupted only anteriorly by the pulmonary trunk. The right auricle and the left auricle are readily observable dorsal to the coronary sulcus. As in the cat, the auricles extend the atria and have scalloped margins. The anterior and posterior surfaces of the heart each bear an interventricular sulcus (Figure 7.H1 and Figures 7.H3 through 7.H5); that on the anterior surface is the **interventricular paraconal sulcus**, whereas that on the posterior surface is the **interventricular subsinuosal sulcus**. The coronary sulcus and interventricular sulci mark, externally, the positions of the four chambers of the heart. Thus, as may be observed in Figure 7.H1, the apex of the heart is part of the **left ventricle**. The sulci generally contain fat and mark the main path of vessels, the **coronary arteries** and **coronary veins** (the veins are also commonly referred to as cardiac veins, and Hermanson et al., 2019, use coronary and cardiac interchangeably for the veins in the dog) that respectively supply and drain the **myocardium**, the muscular portion of the heart. These vessels are easily observable on the cat heart, as the vessels are injected, but they are not as clear in the uninjected sheep heart; however, several of the vessels are indicated.

The interventricular paraconal sulcus begins at the coronary sulcus and extends obliquely from left to right toward the apex. Along it passes the descending branch of the **left coronary artery** (labeled in the cat heart, Figure 7.55) and the **great coronary vein**. The **circumflex branch** of the left coronary artery (noted again later) extends to the left along the coronary sulcus and reaches the posterior surface of the heart. The great coronary vein follows the circumflex branch along the coronary sulcus. The **right coronary artery** extends to

Above: Heart of the sheep (*Ovis aries*) in ventral view with (*a*) a photograph and (*b*) interpretive illustration of the same specimen.

Book citation: De Iuliis, G and D. Pulerà. 2019. *The Dissection of Vertebrates: A Laboratory Manual*. Third Edition. Academic Press.

With the ink barely dry on the third edition, Gerry and I are already planning the fourth edition and there is also interest in a Chinese edition. This book has definitely been a colossal labour of love and a professional dream come true. Hopefully sales for the third edition will warrant a future edition. If that day arrives, Gerry and I will have our cowboy hats on and be ready for the next rodeo.

Highlights from first edition:

- Systemic approach in a systemic framework
- Full colour illustrations and photos
- 275 pages with 210 figures

Highlights from second edition:

- Reptile and mammal skulls
- Mudpuppy musculature
- Corrected inconsistencies plus revisions
- 331 pages with 257 figures

Highlights from third edition:

- Prevertebrates including Urochordata (tunicate) and Cephalochordata (lancelet)
- Sheep heart
- Gravid shark plus embryo
- Extensive revisions to the entire text and figures
- 392 pages with 296 figures

Right: A marketing illustration created during Discovery Channel's Shark Week to promote the new edition of the book.

Introducing Focus Issues in 2020

The editorial staff at JNSI is introducing an editorial calendar that includes Focus Issues. We encourage those who specialize in the topics of the Focus Issues to submit articles for consideration. We will still consider articles that are not within the focus topics; please continue to send us your ideas even if they're not in the schedule below.

- **2020-1:** This issue is not a Focus Issue (approved articles due January 20th)
- **2020-2:** *Botanical Illustration* (approved articles due April 27th)
- **2020-3:** *Working Collaboratively* (approved articles due September 21st)
- **2021:** *Birds*, *Entomology/Invertebrates*, *Earth Science/Paleontology*
- **2022:** *Astronomy*, *Marine*, *Medical/Human*

The *Working Collaboratively* issue will highlight illustrators working collaboratively with scientists to produce artwork that enhances scientific research or promotes understanding. It can also include ways members work together with scientists to secure funding for a project.

If you'd like to submit an article, please send your abstract to *journal@gnsi.org*. Author guidelines are available on our website. Our Journal is only possible because of our members' willingness to share their work with others. Thank you!

Book Review:

STRIPPED BARE: The Art of Animal Anatomy

— Reviewed by Gail Guth

Stripped Bare is a visual treat—in the author's words, "the intertwined intellectual and artistic journeys of animal anatomy from antiquity to the present day." The book is chock-full of animal anatomy illustrations (260 over the book's 256 pages) that are a rich delight, from ancient stone models of lamb livers used in augury to modern-day plastination and Magnetic Resonance Imaging.

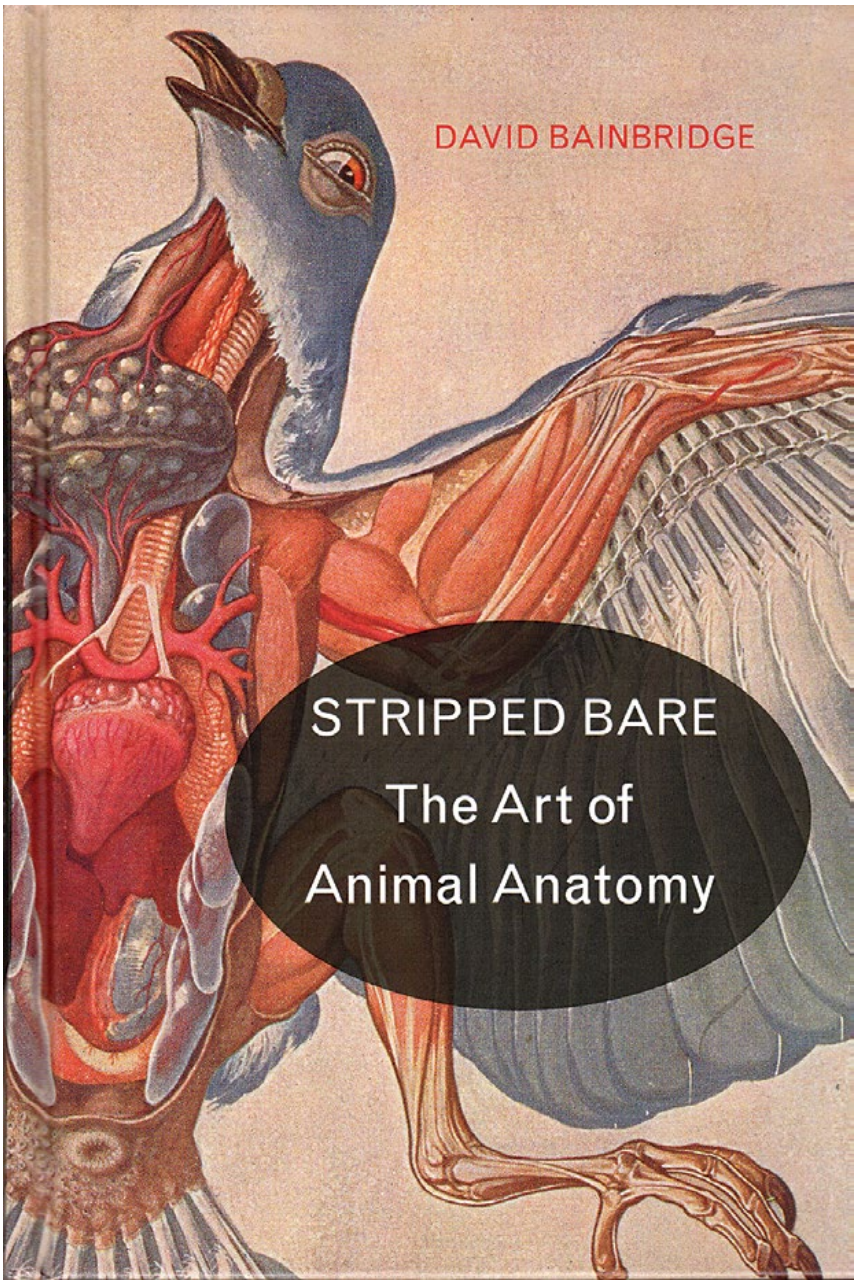
For clarity and brevity, the author limits the discussion and imagery to vertebrates, and divides the timeline of anatomical illustration into five segments:

- ***Antiquity to the 15th century:*** from pteroglyphs through Medieval bestiaries to DaVinci
- ***The 16th century:*** horse anatomy, reflecting the horse's unique and important place in human history
- ***17th to 19th centuries:*** revealing the era's obsession with the discovery of amazing animal diversity and oddities
- ***The 19th century:*** discoveries in embryology and evolution
- ***The 20th century to the present:*** new technologies advancing science and art

Each segment is introduced by a brief overview of the major influences of the period and the role that anatomical art played in shaping those influences (and vice versa). Numerous examples of the most notable art of the era are included with descriptive and informative captions. Short essays feature the most influential artists of the period (DaVinci, Dürer, Ruimi, Stubbs, Coiter, Currier, Brehm, Owen, Haeckel, Muybridge, Cajal, and Thompson).

The images alone are fascinating. Although some are startling, even grotesque, they represent an amazing variety of media, substrate, and incredible creativity in their approach to the complexity of accurately and clearly depicting internal anatomy. Many of the works, despite their age, are so accurate they are still used today in comparative anatomy classes. Equally fascinating is the wealth of artistic technique and skill. Many images are exquisite and delicate in their own right but also display deft understanding of the creatures they depict, moving beyond mere clinical observation to a deep understanding of—and respect for—our connection to our fellow creatures.

I found Bainbridge's writing style to be deft and often delicate as well; his discussions are clear and pointed, with the occasional touch of whimsey and emotional nuance that takes this beyond a mere exposition of artwork, revealing a clear passion for both art and



Above: The cover of *STRIPPED BARE: The Art of Animal Anatomy* by David Bainbridge. © Princeton University Press

Hardcover 2018
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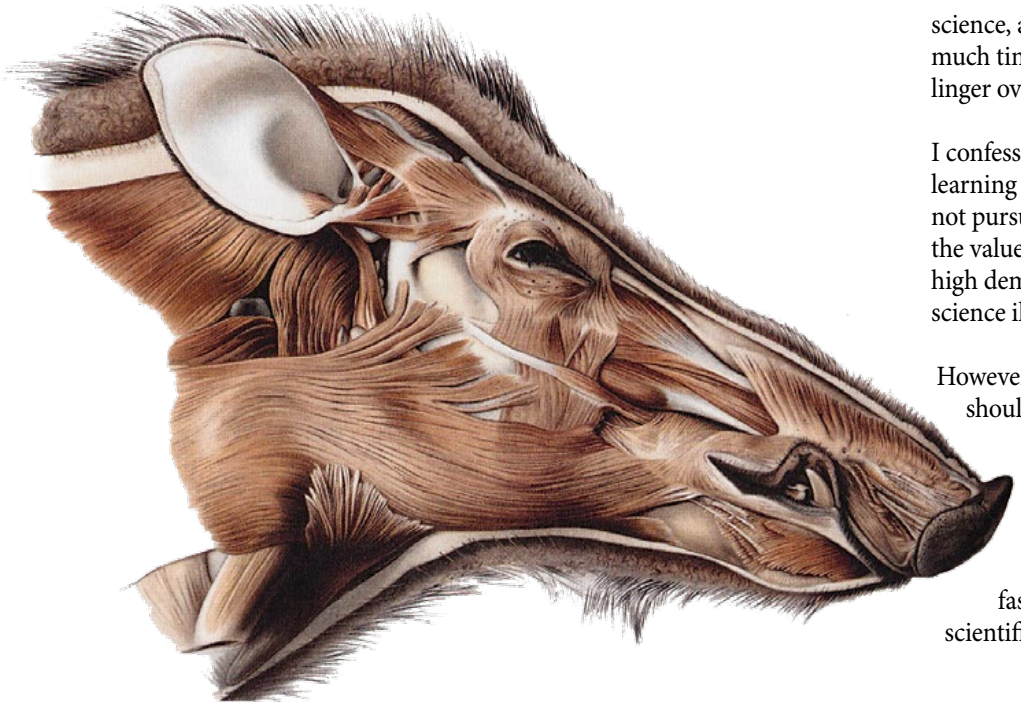
E-book
ISBN 9780691183978



Above: Superficial musculature of a boar. J. E. V. Boas (1855–1035) and Simon Paulli (1865–), *The Elephant's Head: studies in the comparative anatomy of the organs of the head of the Indian elephant and other mammals*, 1908.

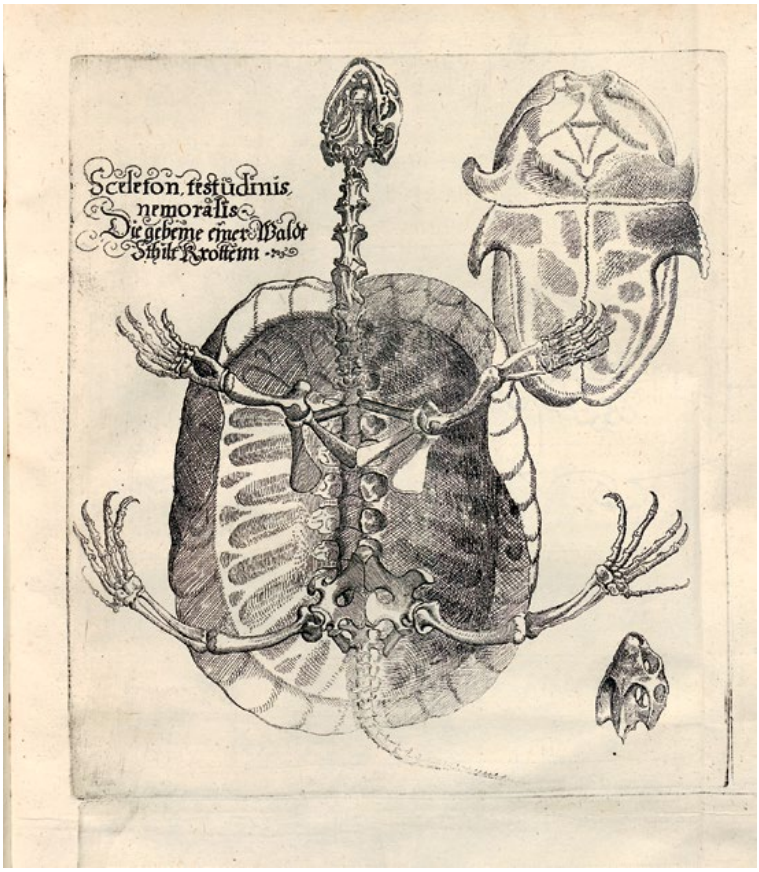
science, and how they interact. The book will not take much time to read, but do allow plenty of time to linger over the images!

I confess to not being an avid art historian; I enjoy learning art history when I come across it, but I do not pursue it. Therefore it's difficult for me to assess the value of this book to others. I suspect it will be in high demand due to its relative rarity; there are few science illustration history books in circulation.

However you approach the premise of the book, you should enjoy it as a delightful collection of animal anatomy art all under one roof and wrapped in such a clear and enjoyable text. There isn't a great deal of hard, practical knowledge to be gained by reading this, but it is, nevertheless, a delight; it is an instructive, fascinating, and inspiring journey in the art of scientific illustration.

DAVID BAINBRIDGE is the author of *Stripped Bare: The Art of Animal Anatomy*, and is a University Clinical Veterinary Anatomist at the University of Cambridge. His other books include *Curvology: The Origins and Power of Female Body Shape* and *Beyond the Zonules of Zinn: A Fantastic Journey through Your Brain*.

Above: *Der Naturen Bloeme*, Jacob van Maerlant (1230/35-c.1291)



Right: Tortoise skeleton. Volcher Coiter (1534–1576), from Gabrielle Falloppio (1523–1562), *Lectiones... de partibus similaribus humani corporis*, 1575.

Pricing Illustrations

This conversation on pricing your first job is taken from the GNSI Sciart-Listserv. It is lightly edited for readability and clarity. Enjoy!

— Britt Griswold, RRRRipped Guest Editor

Art © Stephen DiCerbo

ORIGINAL POST

PRICING ILLUSTRATIONS

From: Stephen Nachtsheim

My boss asked me to do some illustrations for a paper he is publishing on a new insect species. This would be my first real scientific illustration job, and I'm not sure how to price it! He gave me suggestions, but he said I should look myself as well. As you can guess, the internet hasn't been super helpful in how to price scientific illustrations. So I thought I would ask the experts!

It would just be a pen and ink / stippling illustration. He recommended from $150–$200 for both. Is that a good amount?

RESPONSES

From: Gretchen Halpert

We are not allowed to talk specific prices on this Listserv. One very good reference is the *Graphic Artists Guild Guide to Pricing and Ethical Guidelines.* It gives fee ranges for everything from spot illustrations to full color covers. Also contracts and usage fees.

If you're just starting out, keep track of all the time you spend on a project, from research to rendering, so you can more easily estimate future jobs. ("This job will take me #X hours; I want to make X$/hour...").

Congratulations on this job!

.....

From: Kelly Finan

Congratulations on your first gig, Stephen! I agree that the GAG handbook is a great reference.

There's probably an obvious and very reasonable answer for this, but why aren't we allowed to discuss specific prices on the Listserv? When I was in school for science illustration we never mentioned actual numbers, which was pretty damaging to my business because it's taken the better part of ten years for me to figure out how much to charge. And I occasionally encounter other science illustrators who barely scrape by because they charge half of what I do, which really isn't helping anyone. Is it just a taboo subject, or are we worried about price fixing?

.....

From: Gretchen Halpert

It's because the GNSI is a nonprofit organization and discussing actual numbers would be collusion or price fixing.

For several years, we had a "price guessing" exhibit at the GNSI conference, where price, usage, etc. etc. accompanied artwork. It was a good way to see what types of illustrations were "worth" and how the fee varied according to experience, client, and location. I think Trudy Nicholson set this up.

There are fee discussions in the archives of this Listserv; you can peruse them any time. Britt Griswold has written good formulas for figuring out what to charge—archived on the Listserv. I share these discussions, an old blog on Paul Mirocha's website, and my own formulas with my Distance Program students. Pricing can, and should be, discussed in the appropriate venues.

.....

From: Kelly Finan

Thanks for the explanation. I'm glad to know that there are other good venues in which to discuss this topic and use actual numbers. The "price guessing" exhibit idea is brilliant! I'd love to see that make a comeback.

.....

From: Britt Griswold

The issue of price fixing and collusion is the big bugaboo for this Listserve. It is in fact legal to tell everyone what you charged for a particular job as long as it is 90+ days in the past. I think it is better

THESE POSTS are from the GNSI's SciArt-L Listserv, a friendly place where members can e-mail questions and share ideas about science illustration. If you have not yet subscribed to the Listserv, please visit *gnsi.org/resources/reviews/sciart-l-listserve* for instructions on how to sign up. We would love to hear from you!

to explain the methodology of doing it right and let people plug in the numbers they think are good for them. The biggest unknown is how long does it take you to do the work, and is that time competitive? You can look up past pricing discussions on the Sciart Listserve at *Listserv.unl.edu/cgi-bin/wa?A0=SCIART-L*. Use Search Archives "Advanced Options" and enter "pricing" in the "Subject Contains" field.

Pricing all depends on what sort of illustration you are planning on doing: line/stipple, grayscale shading, color. The underlying research will be similar for all techniques, but the rendering time could be drastically different depending on the technique. You are proposing stipple illustrations. The complexity now comes into play. An extremely simple image would possibly be under $100. A full-blown detailed habitus of an insect could take you 3–4 days to do in high quality. What level of detail are you aiming for?

Questions to consider: What is your time worth? Who owns the image after it has been used? Who has reproduction rights? In the science field the author often expects to be able to distribute the image to any publisher or even offer it up to the world for whoever wants to use it. In that case you will see no additional compensation for reuse, so you need to think of this like "work-for-hire". In fact you may want to look closely at your contract; it may be "work-for- hire", in which case you are legally speaking not even recognized as the creator of the image. In the field of research publications this is not that unusual. Sometimes you have to roll with it, but if you are doing anything that has public appeal, think twice about working this way. If this job is like work-for-hire, fully cover your business needs. If this is something where you retain rights, and there is the possibility of additional revenue from reuse fees; you can be more flexible with your pricing.

Your time is worth more than you know. As a freelancer, you have expenses that need to be covered. Incorporating a slice of your yearly income from this job is something you need to calculate for the days you are on the project. You can find lots of discussion on this topic in the archives of this Listserv. You need to cover stuff like:

- Health insurance (even if you are getting it for "free" from a spouse)
- Retirement (SEP-IRA)
- Business travel (client meetings, etc.)
- Supplies
- Office space (if in your house, include a portion of the rent, mortgage, utilities, etc.)
- Time/fees to promote your business and hunt for more work (up to 25% of your time!)
- Hourly rate for work (your "take-home" pay)
- And a profit for your business entity, beyond your take-home pay (maybe 15%)

Calculate the amounts you need for a whole year and then derive an hourly rate. I have seen hourly rates for the research sometimes quoted at a lower rate than the art hours.

Hourly prices that cover all the items above range from $50–$125. This is usually what is needed for success, depending on where you live and what sort of operation you are running. The high end is what I have seen for medical art services. Another consideration: you would want to charge a little higher for short-term work to cover start-up and shutdown processes, and a little lower for big long project that give your steady work for an extended time. Now the final fee will be based on how fast you can work, and is it competitive with other artists? The only good way to know this is dive in and do it, keep track of your time, and gain knowledge through experience. My experience is that it will take you twice as long as you think it will!

It is well-known that most academic science groups have little money to throw around, so they are going to be looking to get as much work done for as little as possible. But you need to set a floor of some sort that allows you to survive and not starve while doing what you love. A "fully-loaded" salary (includes the indirect benefits, 401K, holidays, health insurance, plus overhead & profit of your employer) for a senior person in the civil service or in industry in the Washington DC area is going to be $125,000+/year. In some locations $80K would meet the same needs. A young person starting out would have to see a "fully-loaded" package of $60–70K/year in the DC area.

These sites might be worth a look:

businessofillustration.com

www.thumbtack.com/p/illustration-rates

creativepro.com/what-charge-project-pricing-versus-hourly-rates

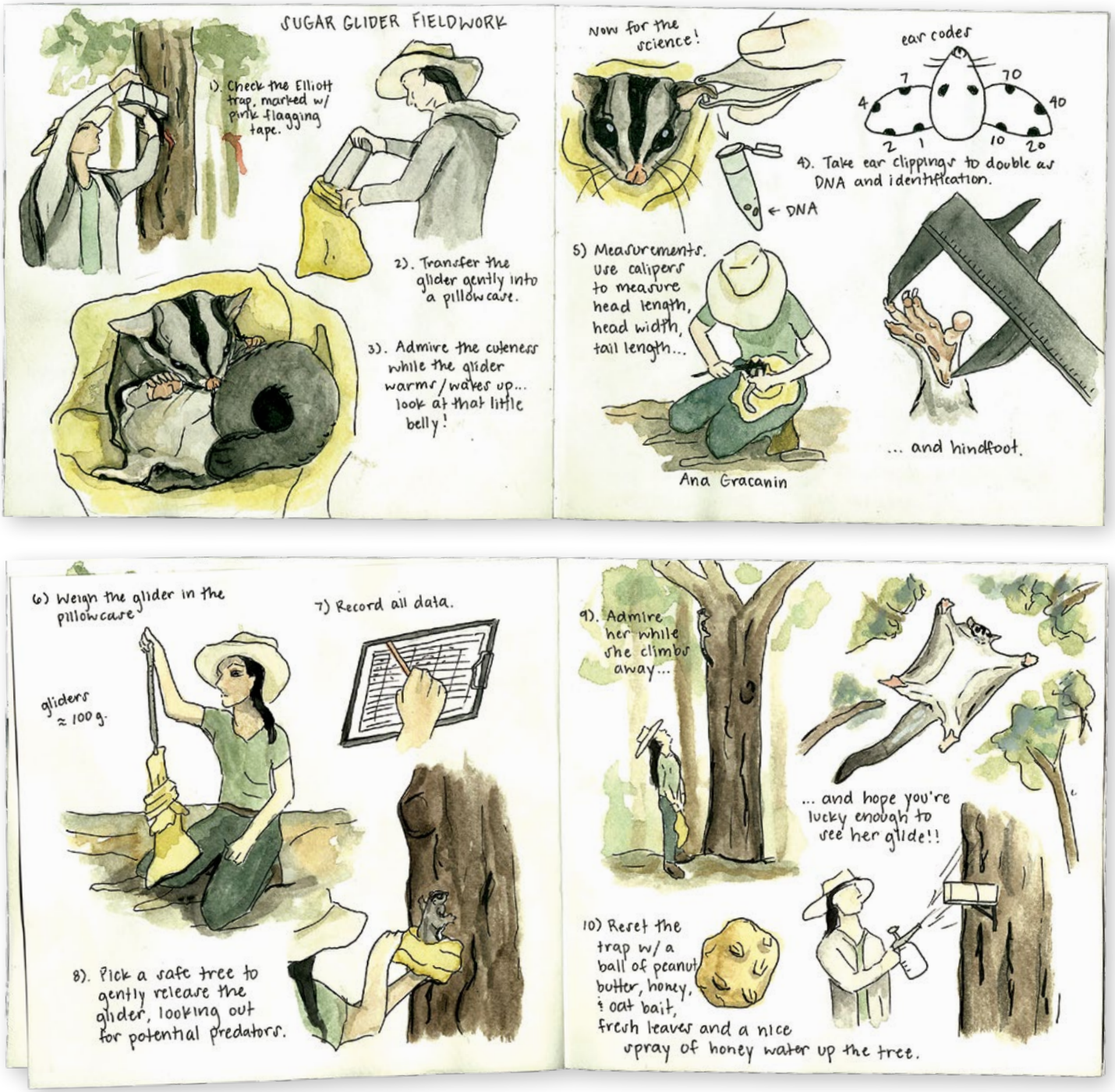
Sketchbook

Sugar Glider Fieldwork

Ph.D. candidate Ana Gracanin has been live-trapping sugar gliders in an attempt to understand their population numbers and distribution in the Berry Wildlife Corridor, NSW, Australia. I've been lucky enough to assist in the fieldwork for several weeks! I created these sketches as a quick description of what we were doing with the gliders. Fieldwork is always such a special experience and I think more active science should be communicated via art! — *Madison Erin Mayfield*

Madison Erin Mayfield is a Natural History Artist who grew up in Texas and now lives in Brisbane, Australia. She holds a BS in Conservation and Evolutionary Biology as well as a certificate in Natural Science Illustration from the University of Washington. Today she works at the Queensland museum preparing collections and designing exhibitions. Through her own work, Madison hopes to inspire others to blend science and art.

Website: *madisonerinmayfield.com*



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