MAKING THE LEAP

How COVID-19 led biology teachers to try humane dissection tools...and what this could mean for the future

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More than 300 artists from coast to coast and around the world shared their creative visions of a more humane, just and compassionate world in NAVS’ 31st annual Art for Animals competition. Artists of all ages illustrated compelling messages in a variety of visual media, with each bringing their own unique perspective to the table.

Judges awarded this year’s “Best in Show” to Ashley Young’s work, “Hide but Don’t Seek,” a piece that the artist says was inspired by her cousin’s dog, who loves to play hide and seek.

“It’s heartbreaking to see not only dogs, but a wide range of animals getting terrible treatment in labs,” Ashley told NAVS. “I hope my piece and others can be shared and understood. We can all do our part to help these creatures find a better home.”

First place went to “If Dreams Come True,” by Manuela Camayo. Second place went to “The Last Hug,” by Concetta Franciamore. Our third-place recipient, “Spread Love not Hatred,” by Vitalina Moldovanova, rounded off our slate of adult winners, while 10-year-old Anastasiya Trubacheva received this year’s Youth Award for her piece, “Open the Door in Your Heart.” Honorable Mention went to “Circle of Love” by Caitlin Courtney.

This year, we added one more prize to the Art for Animals roster. The winner of NAVS’ first-ever “Fan’s Choice” Award, which was voted on and selected from our group of finalists by followers of our social media channels, went to Manuela Camayo’s “If Dreams Come True.”

Finally, special recognition goes to Timothy Golovyashkin’s piece from the Art for Animals archives, simply titled “Dog,” which was chosen to illustrate this year’s NAVS holiday card.

Thanks to all of the amazing artists who lent their talent—and compassion—to our Art for Animals competition.
In the Spring 2020 issue of Animal Action, we introduced NAVS’ Plan for Progress, a multi-faceted action plan aimed at dramatically furthering our mission to end the exploitation of animals used in science. As we approach the end of 2020, we are pleased to report significant progress toward our goals.

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One area of focus is the use of non-human primates (NHPs) in research. Even though the scientific community no longer uses chimpanzees in research, the use of other primates in research has skyrocketed. In 2018, nearly 71,000 non-human primates—macaques, baboons, marmosets and others—were used, and more than 35,000 additional primates were held “in reserve” to be used later.

NAVS’ ultimate goal is to work with the scientific community to exclude all non-human primates from research, building on the victory achieved for chimpanzees.

To date, we have convened a variety of experts to share their perspectives and guide our research, with a near-term objective of disseminating standards and recommendations to reduce the number of NHPs in research. Our approach includes examining scientific and ethical principles to better establish a sense of what is right, what is relevant and what is needed to move forward.

* * *

NAVS is also looking more closely at the use of dogs in research. Although the number of dogs used has declined since their peak use in 1979, nearly 60,000 dogs are still used annually in the U.S. for research, testing, teaching or experimentation.

What’s even more troubling is that we’re finding that most of this cruelty is scientifically unnecessary, a position reinforced in the final report from the National Academies of Sciences, Engineering and Medicine (NASEM) Committee on Assessment of the Use and Care of Dogs in Biomedical Research. The report, which assessed the use of dogs in biomedical research conducted or funded by the U.S. Department of Veterans Affairs, concludes that the use of dogs in VA research “is scientifically necessary for only a few areas of current biomedical research.”

Other findings in NAVS’ study provide additional urgency for the need to reduce and replace dogs in invasive biomedical research:

- Many research publications and grant proposals lack information that should be included in their methods sections. Their failure to address pain management is especially concerning, because it may lead researchers to minimize the importance of mitigating animal suffering, and it prevents a complete determination of adherence to Animal Welfare Act regulations.
- Justifications provided by researchers for choosing a dog experimental model are weak. The NASEM committee, for example, noted that common justifications for using dogs in research were “insufficient alone and constitute a form of circular reasoning that perpetuates the use of laboratory dogs without adequate examination of alternatives.” Essentially, researchers are using dogs because they’ve always used dogs, not because dogs are the best model.
- Advances in genome editing are increasing the development and use of animal models for translational studies of human diseases and therapies. The use of dogs in this area of study is not yet common; however, this is an emerging issue worth monitoring.

Ultimately, shifting research to non-animal models will require researchers to conduct more thorough assessments of potential alternative methods and approaches when justifying (or trying to justify) the use of the dog model. For that reason, a key element of our next phase of work is assessing the availability of viable non-animal alternatives and identifying priorities for the development of new or improved solutions.

The third area of NAVS’ Plan for Progress looks at the issue of classroom dissection, which you can read about in our cover story, “Making the Leap,” found on pages 6-7 of this issue of Animal Action.
HUMANE LEGISLATION BY THE NUMBERS:

**Student Choice**
States (plus the District of Columbia) with statewide laws or policies giving K-12 students the right to opt for an alternative instead of participating in animal dissection (CA, CT, FL, IL, MA, ME, MI, NH, NJ, NM, NY, OR, PA, RI, VT, VA)

**Adoption of Animals After Research**
States with laws requiring dogs and cats to be offered for adoption after research (CA, CT, DE, IL, MD, MN, NV, NY, OR, RI, WA)

**Humane Cosmetics**
States with laws prohibiting the use of animals for product safety testing when alternatives are available (CA, IL, NJ, NY, NV, VA)

**State “humane cosmetics” bills proposed in 2020** (HI, MD, MA, RI)

**State bills proposed to ban the sale of animal-tested products, after previously banning the use of animals for conducting tests** (NJ, NY)

**Adoption of Animals After Research**
States with laws requiring dogs and cats to be offered for adoption after research (CA, CT, DE, IL, MD, MN, NV, NY, OR, RI, WA)

**State “adoption” bills proposed in 2020** (FL, MA, MI, PA, TX)

**MAKING IT LEGAL**
“Animals should no longer be used for the development and production of antibodies for research, regulatory, diagnostic and therapeutic applications” because non-animal-derived antibodies “can offer significant scientific advantages and economic benefits.”


“One important element will be the ability to shift from reliance on animal models as the gold standard for evaluating new approaches. We need to focus instead on understanding human biology and toxicity mechanisms as the basis for establishing scientific confidence in alternative methods.”

Dr. Nicole Kleinstreuer, Acting Director of the National Toxicology Program Interagency Center for the Evaluation of Alternative Toxicological Methods on efforts government agencies are taking to reduce their reliance on animal models for chemical safety testing in “Animal testing alternatives advanced by 16 government agencies,” Environmental Factor, September 2020.

“Using animals as proxies for humans is using centuries-old technology. Thinking outside the animal research paradigm might actually transform vaccine research for the better and ultimately benefit animals and humans.”

Dr. Syd Johnson, Associate Professor at the Center for Bioethics and Humanities at Upstate Medical University, in a personal communication to NAVS regarding using nonhuman primates to test COVID-19 treatments.

“I’ve been troubled by attempts to adapt the virus to some models or adapt some models to the virus. When adapting the virus to some models, so that it more readily infects them and makes them sick, it’s no longer clear to me that we’re talking about COVID-19 models … Attempts to adapt models to the virus are attempts to ‘humanize’ the models.”

Dr. Andrew Fenton, Associate Professor in the Department of Philosophy at Dalhousie University, in a personal communication to NAVS regarding using nonhuman primates to test COVID-19 treatments.

“With no ideal animal model that mimics how SARS-CoV-2 infection leads to COVID-19 in people, several research groups are turning to mini-organs grown from human stem cells to better understand whether and how different organs could become potential targets of infection.”


“Most animals used in biomedical experiments are not accounted for in published papers, a first-of-its-kind study suggests. The analysis found that only one-quarter of more than 5,500 lab animals used over a 2-year period at one university in the Netherlands ended up being mentioned in a scientific paper afterward. The researchers believe the pattern could be similar at institutions around the world, resulting in potentially millions of animals disappearing from scientific studies.”

Chawla, D. S. “Millions of animals may be missing from scientific studies,” Science, October 14, 2020.

“The three Rs don’t take the costs and benefits of animal research into account. They don’t ask questions like, ‘Is the experiment worth pursuing in the first place? Is it too expensive? Is it important enough?’ It just assumes the experiment is worth doing. We want scientists to be asking these essential questions first.”

Dr. David DeGrazia, a bioethicist at George Washington University, on the 3 Rs—replacement, reduction, and refinement of animal research—in “Is it time to replace one of the cornerstones of animal research?,” Science, June 25, 2020.
How COVID-19 Led Biology Teachers to Try Humane Dissection Tools…and What This Could Mean for the Future

When the COVID-19 pandemic struck in the spring of 2020, many schools made the decision to cancel face-to-face classes and move instruction online. Science educators who had planned classroom dissection exercises for their students had to decide whether to change plans and cancel lessons pertaining to dissection or use dissection alternatives, including web-based programs, to deliver their course content online.

NAVS has long touted the advantages of working with humane dissection tools as alternatives to “traditional” dissection. These tools have been widely available for many years and have become more complex with advancements in technology. Importantly, dozens of studies that have compared the efficacy of student learning when using animal dissection or alternatives have concluded that students using animal dissection alternatives perform as well as or better than students using animal models. Humane dissection alternatives can also be interactive, providing students with three-dimensional views of animal organs, background information about the specimen being viewed, and anatomical comparisons of animals and humans, enhancing students’ learning experiences. And many of these virtual tools are available for free or for a nominal fee.

Five years ago, NAVS conducted a nationwide survey of biology educators to learn more about their use of—and attitudes toward—dissection and dissection alternatives. The survey revealed that about 70% of biology educators already used alternatives to animal dissection in some capacity, with 36% using them in place of once-live animals and 34% using them in conjunction with animal-based dissection. For many biology educators this spring, however, using alternative tools in place of dissecting animal specimens was their only option.

Despite humane dissection alternatives being widely available and effective teaching resources, our 2015 survey revealed that about 60% of teachers felt that information about these tools is not widely disseminated. This led us to wonder how biology instructors navigated the transition to online teaching five years later, during the COVID-19 pandemic.

To better understand how the pandemic affected science educator plans to conduct classroom animal dissection exercises this spring, we conducted a new nationwide survey of biology teachers and asked about their experience as classes transitioned online. Specifically, we wanted to learn more about which dissection alternatives educators used the most, how teachers identified those options, and whether the educators planned to continue using these tools for in-person or online learning. We also examined student performance on post-lab assessments using humane dissection tools compared to the historical performance of students who used preserved animal specimens.

To that end, we contacted 27,000 biology teachers across the country this past August and asked them to respond to an online survey. Multiple choice and free response questions addressed the...
ways in which their delivery of course content changed during the COVID-19 pandemic, with a focus on the use of humane dissection tools. More than 2,100 teachers responded to the survey, most of whom were teaching at the high school level.

Our survey revealed that, prior to schools moving to online learning, 72% of biology educators had planned on having their students participate in classroom animal dissection exercises in the spring of 2020. The pandemic led about 67% of educators to cancel their scheduled dissection exercises completely. However, 29% of the educators transitioned to dissection alternatives for remote learning. Most instructors relied on videos of dissections or used virtual dissection resources for online learning. Some of the most commonly used resources were ones from FlinnPrep, Whitman College, Biology Corner, EdPuzzle, McGraw Hill, PBS, Glencoe and eMind. A smaller percentage of educators relied on worksheets or paper models instead.

Sixty percent of instructors were already familiar with the dissection alternative they selected before using it this spring, while 37% of educators had not used the alternative before. Most instructors identified which tool to use by looking online, while fewer instructors made their selection based on ease of use or personal preference, used resources they had relied on in the past, selected resources that aligned with their curriculum or textbook, or relied on a colleague to help them make that decision.

When asked if they would consider using non-animal dissection tools again, the majority of instructors expressed interest in continuing to do so, either remotely or in person. However, the majority of respondents indicated that they would use these tools in conjunction with animal dissection rather than as a replacement for it.

Looking at the performance of students who used dissection alternatives while remote learning this past spring compared to the historical performance of students who used a preserved animal specimen on post-lab assessments, respondents were split fairly evenly in their assessments, with 33% percent of educators indicating that students using alternatives performed as well as or better on dissection-related assessments compared to students using preserved animal specimens, 35% feeling that students using the alternatives performed worse on dissection-related assessments and 32% being unable to make that comparison. It is worth mentioning that this comparison was casual and observational in nature and was not supported by accompanying data. It is possible that overall student performance and educators’ assessments were affected by the move to distance learning, due to general issues with internet connectivity or access to computers or tablets, although our survey did not directly address this question.

While teaching during the COVID-19 pandemic posed challenges for many educators, it also gave science teachers who had previously not worked with humane dissection tools as replacements for animal dissection specimens an opportunity to do so. This push to have educators think outside of the box with respect to traditional animal dissection may help transform science education for the better and may reduce educators’ reliance on animal dissection specimens in the future, particularly when in-person classes resume.

Considering that many of the animals used for dissection are harvested and killed specifically for biological study, reducing the use of animal dissection specimens would be an effective way to incorporate Russell and Burch’s 3 Rs principle—reduction, refinement and replacement of animal use—in education. In the coming months, NAVS will be launching a new, comprehensive online resource showcasing and offering access to the latest state-of-the-art humane science teaching tools. This new resource will demonstrate the breadth of dissection alternatives available and provide guidance to educators who want to replace dissection specimens in their remote and in-person science classes.
Through the International Foundation for Ethical Research (IFER), NAVS provides critical funding to early career researchers who have an interest in developing innovative alternatives to animal experiments.

NAVS founded IFER in 1985, and, to date, we have awarded more than $2 million in Graduate Student Fellowship grants to promising young humane researchers in the United States and around the world.

For Fellowship recipients, an IFER grant is an important step on their path toward smarter, more humane science. But where did their post-IFER careers take them? And what role did NAVS and IFER play in shaping their future scientific work?

We’ve caught up with a few IFER alumni from recent years to find out.
BRYAN HASSELL, PH.D.

NAVS and IFER supported Bryan Hassell’s research efforts at the Wyss Institute for Biologically Inspired Engineering at Harvard University from 2014-16. His work focused on developing an organ-on-a-chip platform to determine how lung cancer cells respond to chemotherapy and to identify new anticancer therapies.

Reflecting upon his graduate school research project, Bryan said that he chose a project that relied upon non-animal methodologies for two reasons.

“One was that the technology seemed promising enough that it actually could be successful in becoming an animal replacement,” he told us. “Two, accelerating human-based preclinical models can also have a huge impact on the disease world and patients.”

Bryan credits the IFER fellowship for opening many doors for him professionally.

“Many people saw the [IFER] video and read about the work through press releases,” he said. “[It] ultimately led to someone reaching out to me who wanted me to work with them after my PhD. The visibility of the project and positive exposure helped me get a job!”

Bryan is currently the co-founder and chief technology officer of a biotech startup called Nirrin Technologies. While developing alternatives to animal testing in his graduate studies, Bryan recognized that the lack of sensors for technologies like organs-on-chips hindered the development of these human-based models. One of the projects currently active at Nirrin is the development of such sensors to help push those technologies forward.

Bryan offered words of wisdom for those students who are interested in pursuing the field of humane science.

“Though working on humane science might be more difficult—it’s easier to inject a mouse with cancer than to build and develop and validate your own human cancer model—it is worth it,” he noted. “The future lies in humanized models of disease. Investing time in it now is what we need to do.”

JEAN LIOU, PH.D.

Jean Liou was awarded the IFER Graduate Student Fellowship for Alternatives to the Use of Animals in Science between 2016 and 2018 for her project aimed at developing an animal-free model to study potential therapies for osteoarthritis in her lab at the University of Pittsburgh.

With the support of IFER, Jean developed an animal-free, three-dimensional model that mimics the anatomic and physiological characteristics of the bone/cartilage interface—a primary site of tissue degeneration in osteoarthritis. This model allowed her to study joint development and the development of osteoarthritis, as well as to screen drugs to treat this debilitating condition.

Jean explained why she chose a project that relied on non-animal approaches for her graduate studies.

“There are currently no effective preventative or disease-modifying osteoarthritis drugs,” she noted, “due in part to the poor physiological congruence between animal models and humans during drug testing.” To address this deficiency, Jean said, she “decided to develop a three-dimensional in-vitro model made up of human stem cells that can develop into and mimic the anatomical and physiological characteristics of our target tissue—the articular joint.”

Jean also reflected on how receiving the IFER fellowship helped her to advance her professional trajectory.

“It was my honor to be an IFER fellowship recipient,” she noted. “Through IFER, I learned how to talk about my research in layman’s terms and, every once a while, ‘zoom out’ a little bit and look at the entire project from a clinical viewpoint. It also highlighted my research abilities to my committee members and faculty within the department.”

Currently, Jean is continuing her work at the University of Pittsburgh. Her post-doctoral research focuses on understanding glaucoma, a disease that causes vision loss and blindness. She is using cells from human donor eyes to do so.

Jean hopes her progress can demonstrate a path forward for other students who are interested in pursuing animal-free research:

“There are many different ways to answer scientific questions. It can be computational simulations using big data and clinical research. It can also be human cell-based organs-on-a-chip! These in vitro platforms utilize human cells and allow a high throughput approach where environmental, genetic, and biomechanical factors can be effectively and efficiently controlled—ideal for studying tissue development, the pathogenesis of the disease, and therapeutic drug screening.”
DANH TRUONG, PH.D.

Danh Truong was another 2016-2018 IFER Fellow. As a graduate student at Arizona State University, Danh used his IFER funding to aid in the development of a 3D microfluidic device to study breast cancer invasion.

Looking back on his graduate school research, Danh recalled why he chose a project that relied on non-animal approaches.

“While everyone is familiar with petri dishes and animal models,” he noted, “not everyone realizes the shortcomings of these models that lead to drug candidates that fail in clinical trials…The use of animal models, while knowing that false positives may be produced, is itself inhumane…I wanted to be a part of a growing field that would hopefully be an integral part of the drug discovery pipeline. This led me to develop an alternative approach to animal models for studying cancer.”

Danh’s research focused on developing a human-relevant cell-based cancer model that better accounts for how the environment surrounding the tumor influences cancer growth, invasion and response to treatment—something missing from most commonly used models.

“Using this system,” he said, “we found key interactions between cancer-associated fibroblasts and breast cancer cells that promoted breast cancer invasion in our device.”

These days, Danh is conducting his postdoctoral studies at the University of Texas MD Anderson Cancer Center. His current research involves using in vitro methods and human clinical samples to study soft tissue sarcomas and bone sarcomas. While he isn’t currently developing non-animal methodologies, he plans to when he transitions into a faculty role.

Danh credits the NAVS/IFER fellowship for shaping his professional trajectory.

“Being awarded the fellowship greatly enhanced my confidence for pursuing a career in academia,” he noted. “I feel that I can really make a difference in science. As an IFER fellow, I felt more comfortable pursuing science and more confident that my findings were significant and would make an impact. I do not take earning [the IFER] fellowship for granted and I truly believe that I would not be in my current position without it.”

As for advice to students interested in pursuing humane science, Danh offered the following:

“I would tell students to be persistent and stay curious. Our curiosity drives us to finding interesting and novel ways for generating new non-animal methodologies. It is only by being curious we came up with some of the models that we have today. Being persistent means that you must continue even if you hit roadblocks. Not all ideas that you generate will pan out, but if you truly believe that it could make a difference, then you must be persistent.”

We couldn’t agree more.

NAVS wishes Bryan, Jean and Danh continued success and are thankful for their efforts to advance science without harming animals. We are honored to count them among the growing number of IFER Fellowship recipients who are leading the next generation of humane scientists.

You can help support smarter science—such as Bryan’s, Jean’s and Danh’s—that advances discovery, innovation and human-relevant solutions without the use of harmful, flawed and costly animal experiments. Visit NAVS.org/IFER to learn more.
Despite all of the other challenges facing our state and federal legislatures this year, NAVS’ advocates have helped make 2020 a productive one for humane legislation. So far this year, NAVS has reviewed more than 2,064 animal-related bills from all 50 states and the District of Columbia, as well as 238 federal bills. Topics included cosmetics testing, puppy mills, a ban on the use of gestation crates, companion animal cruelty, hunting and trapping, animal abuser registries, and bans on the sale of ivory.

The NAVS Advocacy Center posted a record number of these bills, on which we asked advocates and supporters like you to make your voices heard. And you did! You sent tens of thousands of emails to state and federal legislators, urging humane action on pending legislation.

Adoption legislation, which is being championed by NAVS in states across the country, would require research facilities to offer healthy dogs and cats for adoption, either through an internal adoption program or through a reputable shelter or rescue organization, once they are no longer using them. NAVS began actively soliciting legislators to introduce this legislation in 2017. Since then, 11 states (California, Connecticut, Delaware, Illinois, Maryland, Minnesota, Nevada, New York, Oregon, Rhode Island and Washington) have passed such laws. In 2020, Massachusetts and Texas introduced new legislation on this issue, and legislation proposed in 2019 has remained under consideration in three other states (Florida, Michigan and Pennsylvania).

Also this year, bills to end animal testing for product safety were introduced in four states— Hawaii, Maryland, Massachusetts and Rhode Island. Meanwhile, New Jersey and New York, both of which already have product testing bans in place, introduced new bills that would ban the sale of all animal-tested cosmetics that were tested elsewhere. Maryland’s cosmetics bill passed the Senate and has moved to the House for further consideration.

In addition, many federal bills have returned for consideration, including the federal Humane Cosmetics Act, which— to date—garnered 182 cosponsors thanks to advocates like you. The bill still awaits a hearing, however, and the end of the Congressional session means that it will likely need to wait for re-introduction in 2021. The PUPPERS Act (to end research on dogs by the Veteran’s Administration) and the KITTEN Act (to end painful experiments on cats at federal research facilities) were also reintroduced in the 2020 legislative session, though they did not pass. Humane bills continue to garner more and more support each year, and, with your continued support and advocacy, we have high hopes for more progress in 2021.

Be sure to visit the NAVS Advocacy Center at NAVS.org/take-action to support animal-friendly bills (and oppose detrimental ones) in your state or at the federal level.
Over the years we have developed a great friendship with the staff—and animals!—at Ramapo-Bergen Animal Refuge, so when they reached out for help with two kittens, we didn’t hesitate to lend a paw. The NAVS Sanctuary Fund provided emergency medical assistance to AIDA and INKY. Aida was hospitalized and treated for severe eye and upper respiratory infections along with dehydration. Inky needed our help after looking for friends in all the wrong places and suffered from injuries after wandering into a dog play group. Both are doing well thanks to your support of the NAVS Sanctuary Fund.

Kitty Quarters Animal Rescue believes that all animals—from the cute and cuddly youngest to the straggly looking and elderly—have a right to a good life, in a good home, with love and care. Recently, a NAVS Sanctuary Fund grant helped cover the medical costs for VICTORIA, a cat who needed to have her left front leg amputated. Victoria is recovering nicely and has been placed with the same amazing foster family as her sister URSULA. Ursula has been helping Victoria adjust nicely and they play all day together.

It’s no overstatement to say that the coronavirus pandemic has changed all of our lives in many ways, and that includes the drastic impact it has had on many sanctuaries across the country. Fortunately, the NAVS Sanctuary Fund has been able to step in and help multiple sanctuaries during these challenging times. Over the past few months, your support of the NAVS Sanctuary Fund has helped offset increased medical costs for the animals at Carolina Pet Rescue and Esther Neonatal Kitten Alliance; it has helped defray the increase in the price of feed at Voice for Horses Rescue Network; and it is playing a significant role in helping the extraordinary people and animals at Chimp Haven with unanticipated expenditures related to COVID-19.

To learn more about the lifesaving work that is made possible through your support of the NAVS Sanctuary Fund, visit NAVS.org/sanctuary.