



PEOPLE FOR
THE ETHICAL
TREATMENT
OF ANIMALS

March 27, 2025

Alan L. Smith
Interim President
c/o Nancy Hanks, Executive Assistant to the President
Utah State University

Via e-mail: al.smith@usu.edu; Nancy.Hanks@usu.edu

Dear President Smith:

I am writing on behalf of People for the Ethical Treatment of Animals—PETA entities have more than 9 million members and supporters worldwide—regarding a recent disturbing injury we uncovered that a female rat endured during the "Advanced Analysis of Behavior" undergraduate course (PSY 3400) at Utah State University (USU).^{1,2} **Based on the information below, we urge you to ban the use of live animals in the laboratory portion of PSY 3400.**

Rat's Tail Injured During PSY 3400

We learned about the injured animal from USU's October 21, 2024,^{3,4} response to our public records request dated August 27, 2024,⁵ in which we requested access to USU's recent internal communications about PETA's efforts to end the use of animals in PSY 3400 and records related to the care of animals used in this laboratory. According to the October 21, 2024,^{6,7} release, USU personnel within the Psychology Department may have failed to consult with a licensed veterinarian.⁸ In addition, after the initial assessment on September 11, 2024, during which no pain management was administered, the injured rat was not evaluated for 29 days

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¹Letter from USU Records Manager to Flaughner K. October 21, 2024. Accessed February 10, 2024. [25.GR279 PETA Kaylie Flaughner Response Letter.pdf](https://www.peta.org/wp-content/uploads/2025/01/email-re-psy-3400.pdf).

²USU. Public records released to PETA on October 21, 2024, evincing USU's laboratory personnel's communication and a picture of an injured rat. Accessed January 28, 2025. <https://www.peta.org/wp-content/uploads/2025/01/email-re-psy-3400.pdf>.

³Letter from USU Records Manager to Flaughner K. October 21, 2024. Accessed February 10, 2024. [25.GR279 PETA Kaylie Flaughner Response Letter.pdf](https://www.peta.org/wp-content/uploads/2025/01/email-re-psy-3400.pdf).

⁴USU. Public records released to PETA on October 21, 2024, evincing USU's laboratory personnel's communication and a picture of an injured rat. Accessed January 28, 2025. <https://www.peta.org/wp-content/uploads/2025/01/email-re-psy-3400.pdf>.

⁵Letter from Flaughner K. to USU Records Manager. February 28, 2024. Accessed June 11, 2024. <https://www.peta.org/wp-content/uploads/2024/06/2024-02-14-foia-for-usu-psych-3400-documents.pdf>.

⁶Letter from USU Records Manager to Flaughner K. October 21, 2024. Accessed February 10, 2024. [25.GR279 PETA Kaylie Flaughner Response Letter.pdf](https://www.peta.org/wp-content/uploads/2025/01/email-re-psy-3400.pdf).

⁷USU. Public records released to PETA on October 21, 2024, evincing USU's laboratory personnel's communication and a picture of an injured rat. Accessed January 28, 2025. <https://www.peta.org/wp-content/uploads/2025/01/email-re-psy-3400.pdf>.

⁸*Ibid.*

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- PETA Germany
- PETA Switzerland
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until October 14, 2024.⁹ As a result, the animal may have been subjected to unnecessary pain, distress, and potential health complications.

Rebuttal to USU's Inaccurate Statements

This incident underscores the continued harm to animals at USU due to the university's unwillingness to adopt widely available and effective non-animal teaching methods. To date, USU has been unwilling to adopt widely available and effective non-animal teaching methods. This resistance is evident in USU's letter from February 28, 2024,¹⁰ in response to our public records request dated February 14, 2024,¹¹ in which we sought information about a prospective comparison study of virtual models versus live animals, as discussed during the USU Institutional Animal Care and Use Committee (IACUC) meeting on November 17, 2022.¹²

USU's response contained several inaccuracies and demonstrated a lackluster effort to assess the viability of virtual models in PSY 3400. Below, we present an evidence-based rebuttal and renew our request for USU to adopt effective, non-animal teaching methods for PSY 3400, aligning with various cutting-edge approaches at other universities.¹³

USU's claim: In its February 28, 2024 response, USU wrote: "*Note that virtual rat simulators have never been used in PSY 3400, [and] [b]y its very definition, it cannot be done using a simulator.*"¹⁴

PETA's rebuttal: This statement is factually incorrect—USU's website explicitly admits that "[s]tudents [in PSY 3400] traditionally participate in laboratory work for this course via the on-campus pigeon lab *or with an online rat simulator.*"¹⁵ [Emphasis added] The aforementioned assertion from February 28, 2024, is also unsupported by current evidence.¹⁶ Simulation-tools enable scientists and students to test hypotheses, explore complex systems, and predict outcomes in ways that would be impossible, impractical, or unethical to perform in real life.¹⁷ Simulation provides concrete experiential learning opportunities that help students apply their knowledge and skills in practice.¹⁸ Higher

⁹USU. Public records released to PETA on October 21, 2024, evincing USU's examination log pertaining to an injured rat. Accessed February 13, 2025. <https://www.peta.org/wp-content/uploads/2025/02/usu-small-animal-medical-record.pdf>.

¹⁰Letter from USU Records Manager to Flaughter K. February 28, 2024. Accessed June 11, 2024. <https://www.peta.org/wp-content/uploads/2024/06/2024-02-28-no-records.pdf>

¹¹Letter from Flaughter K. to USU Records Manager. February 28, 2024. Accessed June 11, 2024.

<https://www.peta.org/wp-content/uploads/2024/06/2024-02-14-foia-for-usu-psych-3400-documents.pdf>

¹²USU. Public records released to PETA on October 24, 2023, evincing notes from USU's IACUC meeting on November 17, 2022. Accessed February 10, 2025. <https://www.peta.org/wp-content/uploads/2025/02/usu-iacuc-protocol.pdf>.

¹³Goodhue RJ, Liu SC, Cihon TM. Incorporating the portable operant research and teaching laboratory into undergraduate introduction to behavior analysis courses. *J Behav Edu.* 2019; 28(4), 517–541.

¹⁴Letter from USU Records Manager to Flaughter K. February 28, 2024. Accessed June 11, 2024. <https://www.peta.org/wp-content/uploads/2024/06/2024-02-28-no-records.pdf>

¹⁵USU. USU Psychology Community Shares Successes During COVID-19. March 26, 2020.

<https://cehs.usu.edu/psychology/news/usu-psych-community-shares-successes-during-covid-19>.

¹⁶Guest O, Martin AE. How Computational Modeling Can Force Theory Building in Psychological Science. *Perspect Psychol Sci.* 2021;16(4), 789-802.

¹⁷Simulation Scientific Method. Britannica. May 18, 2024. Accessed June 12, 2024.

<https://www.britannica.com/technology/measurement>.

¹⁸Asakura K, Gheorghe RM, Borgen S, Sewell K, MacDonald H. Using Simulation as an Investigative Methodology in Researching Competencies of Clinical Social Work Practice: A Scoping Review. *Clin Soc Work J.* 2021; 49, 231–243.

education has effectively used simulators to facilitate learning complex skills, including in psychology. In fact, a 2020 meta-analysis found that simulation-based learning positively affected learning outcomes across various domains, including psychological counseling.¹⁹ Consequently, simulators are a powerful component of undergraduate psychology laboratories, significantly contributing to research innovation.^{20,21,22}

USU's claim: In its February 28, 2024, reply, USU also wrote: "[V]irtual rat simulators do not have enough functionality to provide a real comparison [to live animal research models for PSY 3400];" "Sniffy 3.0 was most recently published in 2011;" and, "It is outdated and could only likely be used to demonstrate rudimentary and established lessons."²³ Further, in an October 21, 2024 statement²⁴ to PETA, a personnel member (redacted) at USU "evaluated the possibility of comparing the response of the rat behavior simulator 'Sniffy' to real rat responses in a research and teaching environment. [Redacted] experience is that 'Sniffy' could not respond to the auto-shaping technique that is the field standard used in animal behavioral research for the past 30 years. Due to this limitation in the 'Sniffy' simulator any attempt at conducting a comparison study would be pointless and could actually cause the unnecessary use of animals." [Emphasis added.]

PETA's rebuttal: The USU's statements are inconsistent with the approaches taken by other universities where widely available animal-free tools—namely SniffyPro—have been effectively used to teach psychology, including "the principles of shaping and partial reinforcement in an operant chamber."²⁵ Brigham Young University, for instance, successfully uses SniffyPro in its third-year undergraduate course, *Principles of Learning*.²⁶ Another suitable, animal-free platform for college courses in behavior and learning is the Portable Operant Research and Teaching Lab (PORTL). It has been used extensively at the University of North Texas²⁷ "for undergraduate and master's level courses for the last several years. PORTL is used in the very first introductory courses in the undergraduate curriculum, *Behavior Principles I and II*; an advanced undergraduate course, *Building Skills with Behavior Technology*; and a practicum course for first year master's students, *Practicum I*."²⁸ It allows students to investigate various advanced concepts in operant and classical conditioning like "discrimination and generalization,

¹⁹Chernikova O, Heitzmann N, Stadler M, Holzberger D, Seidel T, Fischer F. Simulation-based learning in higher education: A meta-analysis. *Rev Edu Res*. 2020; 90(4), 499–541.

²⁰Fink MC, Radkowsch A, Bauer E, Sailer M, Kiesewetter J, Schmidmaier R, Siebeck M, Fischer F, Fischer MR. Simulation research and design: a dual-level framework for multi-project research programs. *Edu Tech Res Dev*. 2021; 69, 809–841.

²¹Asakura et al. 2021.

²²Fink et al. 2021.

²³Letter from USU Records Manager to Flaughter K. February 28, 2024. Accessed June 11, 2024. <https://www.peta.org/wp-content/uploads/2024/06/2024-02-28-no-records.pdf>

²⁴USU. Public records released to PETA on October 21, 2024, evincing notes from USU's attempt at a simulation study. Accessed February 25, 2025. <https://www.peta.org/wp-content/uploads/2025/02/2024-usu-iacuc.pdf>.

²⁵Wagenmakers EJ, Farrell S. AIC model selection using Akaike weights. *Psychon Bull Rev*. 2004;11(1):192-196. Accessed November 23, 2024. <https://link.springer.com/content/pdf/10.3758/BF03204606.pdf>

²⁶Miller H. Instructor Manual for Sniffy the Virtual Rat. Sniffy the Virtual Rat. Accessed November 22, 2024. <https://www.sniffythevirtualrat.com/HalMillersInstructorManual.pdf>

²⁷Goodhue RJ, Liu SC, Cihon TM. Incorporating the Portable Operant Research and Teaching Laboratory into Undergraduate Introduction to Behavior Analysis Courses. *J Behav Educ*. 2019; 28, 517–541.

²⁸*Ibid.*

compound conditioning, overshadowing and over-expectation effect, as well as inhibitory pre-conditioning, habituation and sensitization, and other areas, frequently discussed in advanced learning courses."²⁹

Rebuttal to USU's Inaccurate Statements in a Recently Released Video

A video recently posted on USU's website attempting to justify using rats to model and characterize human behavior is flawed.³⁰ First, USU's claim that rats can effectively model complex behaviors, such as addiction or learning in humans, is problematic. These behaviors in humans are influenced by a complex interplay of psychological factors (abstract thinking), social influences (peer pressure), and economic conditions (financial stress), which cannot be accurately replicated in a laboratory setting with rats.³¹

The video also suggests that findings from behavioral experiments on rats can be directly applied to human treatments. A growing body of literature highlights the poor predictive value of animal research for human outcomes, with less than 5% of therapeutic interventions tested in animals successfully translating to human applications.^{32,33}

Another claim suggests that exposing students to animal experiments is essential for career preparation. On the contrary, job readiness does not necessitate animal testing. Animal-free methods such as computational modeling and microfluidic systems offer valuable research experience and equip students with cutting-edge skills that will only become more sought after in academia and the industry.^{34,35}

Finally, locking rats in basic cages³⁶ is inherently unsafe. Animals in academic laboratories are managed on a rotational basis, with staff taking turns handling different responsibilities and with frequent gaps in oversight. Subtle changes in animal behavior or the environment are too often missed or neglected and cause animal suffering.³⁷ Ultimately, the video fails to provide a genuine perspective and does not prioritize the well-being of students or animals.

²⁹SniffyPro. Accessed June 11, 2024. <https://apps.microsoft.com/detail/9pcb1w9hz46x?hl=en-US&gl=US>.

³⁰USU. USU lab uses rats to help learn about human behavior. USU. Accessed March 24, 2025.

<https://www.usu.edu/today/story/usu-lab-uses-rats-to-help-learn-about-human-behavior>.

³¹Sarapultsev A, Komelkova M, Lookin O, Khatsko S, Gusev E, Trofimov A, Tokay T, Hu D. Rat Models in Post-Traumatic Stress Disorder Research: Strengths, Limitations, and Implications for Translational Studies. *Pathophysiol.* 2024, 31, 709-760. <https://doi.org/10.3390/pathophysiology31040051>.

³²Ineichen BV, Furrer E, Grüninger SL, Zürrer WE, Macleod MR. Analysis of animal-to-human translation shows that only 5% of animal-tested therapeutic interventions obtain regulatory approval for human applications. *PLoS Biol.* 2024; 22(6): e3002667. <https://doi.org/10.1371/journal.pbio.3002667>.

³³Frühwein H, Paul NW. "Lost in translation?" Animal research in the era of precision medicine. *J Transl Med.* 2025; 23, 152. <https://doi.org/10.1186/s12967-025-06084-3>.

³⁴BDO. The promise of non-animal new alternative methods (NAMs) in the outsourced pharma industry. July 2024. Accessed March 17, 2025. <https://www.bdo.co.uk/getmedia/35ebbfe2-42e8-4480-8e92-f948af00c33a/LS-Report-The-promise-of-non-animal-new-alternative-methods-%28NAMs%29-in-the-outsourced-pharma-industry.pdf>.

³⁵Knight A. Non-animal methodologies within biomedical research and toxicity testing. *Altex.* 2008; 25 (3), 213-231. <https://www.limav.org/international/wp-content/uploads/2016/10/Knight-2008-Non-animal-methodologies-within-biomedical-research-and-toxicity-testing.pdf>.

³⁶Makowska IJ, Weary DM. The importance of burrowing, climbing and standing upright for laboratory rats. *R Soc Open Sci.* 2016; Jun 29;3(6):160136. [doi: 10.1098/rsos.160136](https://doi.org/10.1098/rsos.160136).

³⁷USU. Public records released to PETA on October 21, 2024, evincing USU's laboratory personnel's communication and a picture of an injured rat. Accessed January 28, 2025. <https://www.peta.org/wp-content/uploads/2025/01/email-re-psy-3400.pdf>.

USU's Refusal to Adopt Animal-Free Methods Hinders Student Learning

The quest for a perfect model of animal behavior is intrinsically futile. This is true even if that model is a live rat in a cage—which, while somehow informative about animal behavior, is a flawed generalization about an infinitely complex system forced to function in a highly depauperate environment. Besides unnecessary economic costs, the ethical costs of relying on such flawed models include the continued exploitation and injury to animals, as evidenced by the recent tail injury incident at USU,³⁸ despite the availability of educationally sound animal-free methods (please see enclosed Supplemental Brief).

Therefore, the reluctance to embrace these tools appears not to stem from their simplicity—since they have been successfully employed by other institutions—but rather from a lack of commitment among USU faculty to learn about and adopt new teaching methods. This reluctance, in turn, hinders preparing students with the necessary skills and knowledge for a future where proficiency with technology-driven educational practices and advanced digital tools will be indispensable, and animal exploitation for primary undergraduate education will become increasingly obsolete.

A growing population of students and faculty at USU who reject the abuse of animals should not be overlooked.³⁹ Their stance reflects a broader societal shift towards more humane and ethical practices, which educational institutions are responsible to honor and foster.⁴⁰

You can contact me directly at MaggieW@peta.org. I'm happy to meet with you to discuss this matter further if you prefer. Thank you for considering this important issue, and I look forward to your response.

Sincerely,



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cc: Amy Odum, PhD, Professor, Department of Psychology (amy.odum@usu.edu)
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Enclosure: Supplemental Brief Regarding Animal-Free Psychology Training Methods

³⁸USU. Public records released to PETA on October 21, 2024, evincing USU's laboratory personnel's communication and a picture of an injured rat. Accessed January 28, 2025. <https://www.peta.org/wp-content/uploads/2025/01/email-re-psy-3400.pdf>.

³⁹Rossi M. Letter: USU should adopt non-animal policy. HJ News. May 1, 2024. Accessed June 11, 2024. https://www.hjnews.com/opinion/letters_to_editor/letter-usu-should-adopt-non-animal-policy/article_b17fc0b0-07dd-11ef-a8e3-97dece485684.html.

⁴⁰Pew Research Center. 2015. Americans, politics and science issues. Accessed November 21, 2024. <https://www.pewresearch.org/science/2015/07/01/americans-politics-and-science-issues/>.

Supplemental Brief: Replacing Animal Use in Undergraduate Psychology Education

American Psychological Association Supports Nonanimal Training

The American Psychological Association's (APA) "Guidelines for Ethical Conduct in the Care and Use of Nonhuman Animals in Research" states, "Consideration should be given to the possibility of using nonanimal alternatives."¹ In its "Resolution on the Use of Animals in Research, Testing, and Education," the APA mandates that "the development and use of complementary or alternative research or testing methodologies, such as computer models, tissue, or cell cultures, be encouraged where applicable and efficacious."² Another APA document titled, "The Ethical Principles of Psychologists Code of Conduct," indicates that experiments that inflict pain, stress, or privation in animals can only proceed, in part, "when an alternative procedure is unavailable."³

Experts, Students, and the Public Oppose the Use of Animals in Education

Depending on the procedure, up to 60% of psychology students oppose the use of animals in psychology education.⁴ Many psychologists and psychology students believe that live animal experimentation should not be required in undergraduate psychology courses⁵ or that animal experimentation is becoming less of a focal point in psychology.⁶ Many college-aged adults are opposed to experiments on animals.^{7,8} A Pew Research Center survey found that 52% of Americans oppose all tests on animals,⁹ and a Morning Consult survey found that the vast majority—80% to 85%—of U.S. residents think experiments on animals should be phased

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¹American Psychological Association. Guidelines for ethical conduct in the care and use of nonhuman animals in research. 2022: 1-5. Accessed March 21, 2025.

<https://www.apa.org/science/leadership/care/animal-guide.pdf>.

²American Psychological Association. Resolution on the use of animals in research, testing, and education. 1990. Accessed March 21, 2025. <https://www.apa.org/science/leadership/care/animal-resolution.pdf>.

³American Psychological Association. The Ethical Principles of Psychologists Code of Conduct. Accessed March 21, 2025. <https://www.apa.org/ethics/code/principles.pdf>.

⁴Cunningham PF, Randour ML. Animals in Psychology Education: A Guide to Understanding the Issue of Student Choice Handbook. Accessed August 5, 2024.

[Student Choice in the Psychology Classroom A Handbook 1999.pdf](https://www.apa.org/ethics/code/principles.pdf).

⁵Cunningham. 2000.

⁶Wieczorek O, Unger S, Riebling J, Erhard L, Koß C, Heiberger R. Mapping the field of psychology: Trends in research topics 1995–2015. *Scientometrics*. 2021: 126, 9699–9731. doi.org/10.1007/s11192-021-04069-9.

⁷Goodman JR, Borch CA, Cherry E. Mounting opposition to vivisection. *Contexts*. 2012:11(2), 68-69. [doi:10.1177/1536504212446466](https://doi.org/10.1177/1536504212446466).

⁸Plous S. Attitudes toward the use of animals in psychological research and education: results from a national survey of psychology majors. *Psychol Sci*. 1996: 7(6), 352-358. <https://doi.org/10.1111/j.1467-9280.1996.tb00388>.

⁹Pew Research Center. 2018, August 16. Americans are divided over the use of animals in scientific research. Pew Research Center. Accessed March 24, 2025. <https://www.pewresearch.org/short-reads/2018/08/16/americans-are-divided-over-the-use-of-animals-in-scientific-research/>.

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out and tax dollars spent on non-animal studies instead.¹⁰ Therefore, employing nonanimal educational tools creates an engaging, inclusive, and safe learning environment for instructors and students, including those uncomfortable with animal experimentation.^{11,12}

Animal-free Psychology Training Tools are Available and Effective¹³

Below are various interactive methods that allow students to design and conduct experiments, observe animal behavior in simulated and real-world settings, and gather and analyze data—without harming animals. These resources provide diverse and engaging learning experiences in psychology education, combining theoretical knowledge with practical simulations to enhance the understanding of operant conditioning and behavioral analysis:

- **Sniffy the Virtual Rat¹⁴**: This interactive simulation of a rat in BF Skinner's operant chamber allows psychology and neurobiology students to explore various aspects of operant and classical conditioning through experimentation without exploiting animals.¹⁵ Users can archive the data files and graphical outputs generated during the experiments and access them for future manipulation or extraction.¹⁶ A team of researchers at the University of Houston-Victoria reported that "[c]ompared with standard study, using this virtual laboratory significantly increased students' comprehension of concepts, raising their comprehension scores from 63% to 76%."¹⁷
- **SniffyPro¹⁸**: This version of Sniffy [is] an advanced alternative to Sniffy the Rat simulator and is suitable for the upper year and advanced college courses in behavior and learning without using live animals.¹⁹ This tool allows students to "perform 'classic' experiments that closely resemble those discussed in standard textbooks on the psychology of learning. Using SniffyPro, students can perform exercises that demonstrate most of the major phenomena of operant and classical conditioning."²⁰ Simulated examples of classical conditioning phenomena "include: acquisition, extinction, spontaneous recovery, the effects of manipulating the intensity of the [conditioned (CS) and unconditioned (US) stimuli], compound conditioning, blocking, overshadowing, over-expectation, inhibitory conditioning, sensory preconditioning, higher-order/background conditioning, the nature of the classical-

¹⁰Physicians Committee for Responsible Medicine. (n.d.). Animal testing survey. Physicians Committee for Responsible Medicine. Accessed March 24, 2025. <https://pcrm.widen.net/s/qzfxtfh7bw/animal-testing-survey>.

¹¹Bbalcombe J. The use of animals in higher education: problems, alternatives, and recommendations. Hynabe Sicuet Press. Washington, DC, USA. Accessed January 22, 2025.

<http://www.wellbeingintlstudiesrepository.org/cgi/viewcontent.cgi?article=1005&context=ebooks>

¹²Kahrass H, Pietschmann I, Mertz M. Why Do I Choose an Animal Model or an Alternative Method in Basic and Preclinical Biomedical Research? A Spectrum of Ethically Relevant Reasons and Their Evaluation. *Animals*. 2024; 14(4), 651. doi.org/10.3390/ani14040651.

¹³Goolkasian P, Ludwig TE, Froman R. Software Tools in the Teaching of Psychology Best Resources List. January 15, 2005. Accessed August 5, 2024. <https://teachpsych.org/Resources/Documents/otrp/pedagogy/bestlists.pdf>.

¹⁴Sniffy the Virtual Rat. Accessed August 5, 2024. <http://www.sniffythevirtualrat.com/>.

¹⁵Alloway T, Wilson G, Graham J. 2005. Sniffy the Virtual Rat: Pro Version 2.0. Wadsworth Cengage Learning; 2005. Belmont, CA: Thomas West

¹⁶Jakubow JJ. Review of the Book Sniffy the virtual rat pro version 2.0. *J Exp Anal Behav*. 2007; 87(2), 317–23. [doi: 10.1901/jeab.2007.07-06](https://doi.org/10.1901/jeab.2007.07-06).

¹⁷Foreman N. Virtual reality in psychology. *Themes Sci Technol Educ*. Special Issue. 225-252. <https://files.eric.ed.gov/fulltext/EJ1131318.pdf>

¹⁸Sniffy the Virtual Rat (n.d.). Why Use Sniffy? Accessed August 5, 2024. <https://www.sniffythevirtualrat.com/index.htm>.

¹⁹Mac App Store Preview. Sniffy Pro. Accessed August 5, 2024. <https://apps.apple.com/us/app/sniffypro/id1528526105?mt=12>.

²⁰*Ibid.*

conditioning association..., and CS and US pre-exposure effects."²¹ In addition, examples of simulated "operant conditioning phenomena include: maze training; shaping; extinction; spontaneous recovery; primary and secondary reinforcement; variable-interval; variable-ratio; fixed-interval, and fixed-ratio schedule effects; the partial-reinforcement effect; simple and complex stimulus-discrimination learning; stimulus generalization; and the effects of punishment on extinction."²² "An integrated manual with step-by-step instructions makes the program accessible even to unsophisticated computer users."²³

- **(AI)² Inc.'s CyberRat Operant Laboratory Simulations Program²⁴**: CyberRat is a digital, fully interactive video of a real animal in an operant conditioning chamber. The program database contains over 1,600 behavioral video clips seamlessly played back in unique sequences using stochastic algorithms.²⁵ Student record keeping and data archives are maintained to give instructors easy access to student progress summaries. CyberRat "serves as a functional supplement and total replacement for various live animal laboratory exercises using rats when used in introductory psychology laboratories."²⁶ It's "as close to an actual behaving animal as you can get,"²⁷ offering "a near-perfect illusion of being a single animal that quite realistically demonstrates basic operant conditioning phenomena embedded in a flow of natural behaviors."²⁸
- **The Learning Simulator²⁹**: The Learning Simulator is an open-source software that simulates many learning theories in humans and other animals, including the acquisition and extinction of behavior, learning of behavioral sequences, and various social-learning scenarios.³⁰ It is particularly valuable in teaching undergraduate psychology as it provides a hands-on understanding of learning theories such as Pavlovian conditioning without the need for animal subjects, making it an ethical alternative for educational purposes. Beyond education, the Learning Simulator is often used in fundamental research to explore learning phenomena in humans and animals, with applications in animal welfare (e.g., behavioral problems in domestic animals) and clinical psychology of anxiety or depression.³¹ This simulator has been featured in several scientific publications,^{32,33,34} and used as a teaching tool at the master's program in ethology at Stockholm University, the veterinary program at

²¹*Ibid.*

²²*Ibid.*

²³*Ibid.*

²⁴(AI)² Inc. CyberRat. Accessed August 5, 2024. <https://www.ai2inc.com/HomeProducts/cyberRat.html>.

²⁵Norecopa. CyberRat: Operant Laboratory Simulation Program. April 16, 2020. Accessed August 5, 2024. <https://norecopa.no/norina/cyberRat-operant-laboratory-simulations-program>.

²⁶Ray R, Miraglia K. A sample of CyberRat and other experiments: Their pedagogical functions in a learning course. *J Neurosci Res*. 2011; 9, 44-61.

²⁷Phelps B. How close to real can a non-real CyberRat behave? *Behav Phil*. 2011; 39/40, 309-315.

<https://www.proquest.com/scholarly-journals/how-close-real-can-non-cyberRat-behave/docview/1564231342/se-2>.

²⁸Iverson I. Commentary on CyberRat. *Behav Phil*. 2011; 39/40, 303-307. <https://www.jstor.org/stable/behaphil.39-40.303>.

²⁹The Learning Simulator. Accessed August 5, 2024. <https://www.learningsimulator.org/>.

³⁰The Learning Simulator. Accessed August 5, 2024. <https://www.learningsimulator.org/education>.

³¹The Learning Simulator. Accessed August 5, 2024. <https://www.learningsimulator.org/>.

³²Ghirlanda S, Lind J, Enquist, M. A-learning: A new formulation of associative learning theory. *Psychon Bull Rev*. 2020; 27, 1166-1194.

³³Lind J. What can associative learning do for planning? *R Soc Open Sci*. 2018;5, 180778. doi.org/10.1098/rsos.180778.

³⁴Lind J, Ghirlanda S, Enquist M. Social learning through associative processes: A computational theory. *R Soc Open Sci*. 2019;6, 181777. <https://doi.org/10.1098/rsos.181777>.

the Swedish University of Agricultural Sciences, and the psychology department at Brooklyn College, City University of New York.³⁵

- **SuperLab**^{36,37}: SuperLab is a general-purpose experiment generator for psychology experiments involving human participants. It lets students experiment with various psychological phenomena, including perception and attention, memory, reasoning, perceptual representation, and representation of meaning, without a need for programming skills. It's an excellent alternative to animal use. SuperLab platform supports text, picture, audio, video, and gaze-tracking components but does not require prior programming skills. Beyond being a user-friendly teaching tool, SuperLab has been used in numerous peer-reviewed studies, demonstrating its reliability and effectiveness in experimental research. For example, it has been employed in studies examining cognitive processes, reaction times, and perceptual tasks, showcasing its broad utility in scientific investigations.³⁸
- **PsychMate**³⁹: PsychMate is a "set of software tools for undergraduate psychology students to [develop], run ..., and analyze [realistic] experiments ... in the areas of perception, cognition, social psychology, human factors, and cognitive neuroscience."^{40,41} While using this platform, students can work independently or collaborate with others. The automatic spreadsheet analysis forms allow students to analyze their data and create presentations and Web pages.⁴² Associated applications such as the Brain-Tutor and BrainViewer teach brain anatomy and permit students to analyze fMRI brain imaging data from subjects who have performed ... memory experiments—similar to those covered by PsychMate users."^{43,44} According to one study, "PsychMate has been used in 83 classes in which 1,533 students submitted 5,464 completed experiments with few (less than 1%) requests for help and a positive rating of the research experience."⁴⁵
- **E-Prime**⁴⁶: This is a widely used software package in educational and research settings. It enables the creation and execution of complex experimental paradigms, such as classical and operant conditioning.⁴⁷ Students can engage in real-world research practices, from hypothesis testing to data analysis, gaining theoretical knowledge and practical experience for careers in psychology and related fields. E-Prime's user-friendly interface and comprehensive tools

³⁵Jonsson M, Ghirlanda S, Lind J, Vinken V, Enquist M. Learning Simulator: A simulation software for animal and human learning. *J Open Source Softw.* 2021; 6(58), 2891. [doi:10.21105/joss.02891](https://doi.org/10.21105/joss.02891).

³⁶Cedrus. Enjoy making experiments. Accessed December 8, 2023. <https://cedrus.com/superlab/index.htm>.

³⁷Haxby JV, Parasuraman R, Lalonde F, Abboud H. SuperLab: General-purpose Macintosh software for human experimental psychology and psychological testing. *Behav Res Methods Instrum Comput.* 1993; 25(3), 400–405. <https://doi.org/10.3758/BF03204531>

³⁸Cedrus. A sample of research papers that used SuperLab. Accessed December 8, 2023.

<https://cedrus.com/superlab/publications.htm><https://cedrus.com/superlab/publications.htm>.

³⁹PsychMate. Psychology Software Tools. Accessed July 18, 2023. <https://pstnet.com/products/psychmate/>.

⁴⁰Eschman A, James JS, Schneider W, Zuccolotto A. PsychMate: Providing psychology majors the tools to do real experiments and learn empirical methods. *Behav Res Methods.* 2005; 301–311. [doi: 10.3758/bf03192698](https://doi.org/10.3758/bf03192698).

⁴¹Experiments for Teaching Psychology. Accessed July 18, 2023. <https://pstnet.com/wp-content/uploads/2017/09/PsychMateProductSheet.pdf>.

⁴²Eschman et al. 2005.

⁴³*Ibid.*

⁴⁴Experiments for Teaching Psychology. Accessed July 18, 2023. <https://pstnet.com/wp-content/uploads/2017/09/PsychMateProductSheet.pdf>.

⁴⁵Eschman A, James JS, Schneider W, Zuccolotto A. PsychMate: Providing psychology majors the tools to do real experiments and learn empirical methods. *Behav Res Methods.* 2005; 301–311. <https://doi.org/10.3758/bf03192698>.

⁴⁶Psychology Software Tools, Inc. E-Prime® Stimulus Presentation Software. Psychology Software Tools. Accessed November 21, 2024. <https://pstnet.com/products/e-prime/>.

⁴⁷NeuroSpec AG. (n.d.). E-Prime 3.0. NeuroSpec AG. Accessed March 21, 2025. <https://www.neurospec.com/Products/Details/1068>.

allow students to design and modify experiments without advanced programming skills, making it accessible for beginners and powerful for advanced users. The System for Teaching Experimental Psychology (STEP) project, funded by the National Science Foundation, uses E-Prime to deliver instructional materials and classic experiments for teaching experimental psychology at various educational levels, including undergraduate and graduate courses.⁴⁸ Many universities, including Carnegie Mellon University and George Mason University, incorporate E-Prime into their psychology curricula for lab courses and research projects, helping students develop a deeper understanding of research methods and enhancing their technical skills.⁴⁹ Finally, this tool has been instrumental in generating numerous primary publications.⁵⁰

- **PsyToolkit**:^{51,52} PsyToolkit is a versatile software platform designed for creating and running a wide range of custom psychological experiments, including undergraduate psychology courses.⁵³ The platform allows for the simulation of real-world scenarios where students can observe and analyze the effects of reinforcement, punishment, and behavior shaping.⁵⁴ Its user-friendly interface and robust data analysis capabilities enable students to bridge the gap between theoretical knowledge and practical application, enhancing their understanding of behavior modification principles.⁵⁵ This experiential learning approach deepens comprehension and fosters critical thinking and research skills essential for budding psychologists. One student using PsyToolkit said, "It is very intuitive and even I with little programming knowledge can learn easily and quickly. I recently told my professor that I could imagine using this for my future doctorate. A really good website!"⁵⁶
- **Neuronify**⁵⁷: Neuronify is an educational simulation software facilitating interactive learning about neuronal networks. It provides an accessible platform for students, even those without computational experience, to gain insights into key neuronal processes of memory formation and learning, such as synaptic input integration and feedback inhibition. In a classroom setting, Neuronify can be used on smartphones, tablets, and personal computers, allowing students to build and explore neuronal circuits by adjusting parameters through an intuitive menu. The software's plug-and-play environment enables hands-on learning, where students can use their device cameras as visual sensors or manipulate touch screens to experiment with and understand complex neuronal behaviors.⁵⁸ This interactive approach enhances engagement and deepens understanding of neuroscience concepts.

⁴⁸MacWhinney B, St. James J, Schunn C, Li P, Schneider W. STEP—A System for Teaching Experimental Psychology using E-Prime. *Behav Res Methods Instrum Comp*. 2001: 33, 287–296 doi.org/10.3758/BF03195379.

⁴⁹MacWhinney et al. 2001.

⁵⁰Psychology Software Tools, Inc. E-Prime® Stimulus Presentation Software. E-Prime Publications Accessed November 22, 2024. <https://pstnet.com/e-prime-publications/>

⁵¹PsyToolkit. (n.d.). *PsyToolkit News* Accessed March 17, 2025. <https://www.psytoolkit.org/>

⁵²Stoet G. PsyToolkit: A software package for programming psychological experiments using linux. *Behavior Research Methods*, 2010: 42(4), 1096–1104. [doi: 10.3758/BRM.42.4.1096](https://doi.org/10.3758/BRM.42.4.1096).

⁵³Stoet G. PsyToolkit: A Novel Web-Based Method for Running Online Questionnaires and Reaction-Time Experiments. *Teach Psychol*. 2017: 44(1), 24–31. Accessed March 17, 2025. <https://doi.org/10.1177/0098628316677643>

⁵⁴PsyToolkit. (n.d.). *PsyToolkit: Free online psychology experiments*. Accessed March 17, 2025. <https://www.psytoolkit.org/>

⁵⁵PsyToolkit. (n.d.). *PsyToolkit: Free online psychology experiments*. Accessed March 17, 2025. <https://www.psytoolkit.org/>

⁵⁶PsyToolkit. (n.d.). PsyToolkit News. Accessed March 18, 2025. https://www.psytoolkit.org/#_search_website.

⁵⁷Neuronify is an educational neuronal network app. Accessed July 18, 2023. <https://ovilab.net/neuronify/>.

⁵⁸Dragly SA, Hobbi Mobarhan M, Våvang Solbrå A, Tennøe S, Hafreager A, Malthe-Sørenssen A, Fyhn M, Hafting T, Einevoll GT. Neuronify: An Educational Simulator for Neural Circuits. *eNeuro*. 2017: 4(2), ENEURO.0022-17.

- **The Diffuse Discrepancy Model (DiffDiscM):**⁵⁹ This simulator is an open-source neural network model designed specifically for researchers in behavioral sciences. DiffDiscM⁶⁰ has been applied in theoretical, experimental, and predictive research across various behavioral topics, including conditioning, extinction, spontaneous recovery, choice, instrumental-Pavlovian transfer, inhibition, overshadowing, probabilistic learning, contextual learning, and selective associations, among others.^{61,62} DiffDiscM also provides insights into gross neuroanatomy, including the roles of dopamine and the hippocampus in behavior. Finally, the neurocomputational aspect makes this simulator useful for studying artificial intelligence and machine learning.⁶³ When working with DiffDiscM, students or researchers can select a number of model neurons and create networks of choice, apply various contingencies (e.g., a stimulus reinforced), and automatically observe learning curves in real-time, eliminating the need for time-consuming data analysis. Experiments can be customized to test different neural networks or stimuli, and results are immediately available for evaluation.
- **Virtual reality (VR) tool**⁶⁴: In a pilot study, faculty and staff at Southern New Hampshire University (SNHU) in Manchester, NH, tested the effectiveness of VR in an undergraduate psychology course by using Synapse VR experience—a custom tool developed in collaboration with a global production studio, Unit9. The goal was to create an immersive exercise on neural transmission and conduction to help students understand "the interplay between neural communication, neural circuits and psychological activity and behavior"⁶⁵ and "apply biopsychology to other areas of psychology (e.g., mental health, addiction and development) and disciplines outside of psychology (e.g., economics, law, computer science artificial intelligence and education)."⁶⁶ The faculty at SNHU concluded that they were encouraged to explore the use of VR in higher education and see it as "the future of learning."⁶⁷ In another study, researchers at the University of Central Missouri studied the benefits of using VR technology in an abnormal psychology course. Specifically, they examined if participating in a VR session designed to help clients overcome the fear of flying would enhance [student] comprehension of such psychological treatments. The authors concluded that "incorporating firsthand experience with evidence-based psychological treatments"⁶⁸ [proved helpful] "in enhancing students' understanding [and appreciation] of such treatments."⁶⁹ Such immersion is essential in higher education because, according to a group of psychology educators at the Open University of the Netherlands, in Heerlen,

⁵⁹Miguel2862. (n.d.). DDM-UI. GitHub. <https://github.com/miguel2862/DDM-UI/tree/main>.

⁶⁰Donahoe JW, Burgos JE, Palmer DC. A selectionist approach to reinforcement. *J Exp Anal Behav*. 1993; 60, 17-40. [doi: 10.1901/jeab.1993.60-17](https://doi.org/10.1901/jeab.1993.60-17).

⁶¹Miguel2862.

⁶²Aguayo-Mendoza M, Buriticá J, Burgos JE. Autoshaped impulsivity: Some explorations with a neural network model. *Behav Processes*. 2024; 218. doi.org/10.1016/j.beproc.2024.105040.

⁶³Burgos JE. Evolving Artificial Neural Networks in Pavlovian Environments. *Adv Psychol*. 1997; 58–79. [doi:10.1016/s0166-4115\(97\)80090-8](https://doi.org/10.1016/s0166-4115(97)80090-8).

⁶⁴Flynn C, Frost P. Making VR a Reality in the Classroom. April 16, 2021. Accessed December 6, 2023. <https://er.educause.edu/articles/2021/4/making-vr-a-reality-in-the-classroom>

⁶⁵*Ibid.*

⁶⁶*Ibid.*

⁶⁷*Ibid.*

⁶⁸Stark-Wroblewski K, Kreiner DS, Boeding CM, Lopata AN, Ryan JJ, Church TM. Use of virtual reality technology to enhance undergraduate learning in abnormal psychology. *Teach Psychol*. 2008; 35, 343-348. <https://doi.org/10.1080/00986280802374526>.

⁶⁹*Ibid.*

introductory psychology courses still "lack application of knowledge in solving work-based problems."⁷⁰

These resources provide a range of options for interactive, animal-free learning experiences in psychology education. They offer a blend of theoretical knowledge and practical simulation that can enhance the understanding of operant conditioning and behavioral analysis.

Beyond computer-based learning methods, psychology educators have developed other pedagogical tools that allow students to observe and document the behavior of humans and other animals using harm-free methods, including the following.

- **Nonanimal classroom experiments:** The principles of operant conditioning can and should be applied to human subjects, and educators have developed a range of programs for applying these concepts in classroom laboratory activities.^{71,72} In contrast to using animals as models of human behavior, allowing students to learn basic psychological principles with virtual software and then apply them to studies involving human volunteers may be the most comprehensive way to teach basic research principles, ethics, and applications in an undergraduate psychology course. The following examples are well-established classroom experiments.
- **Pavlovia**⁷³: This is an online platform designed for researchers in the behavioral sciences to run, share, and explore experiments. Initially created as a repository for PsychoPy experiments, Pavlovia now supports other open-source tools like "jsPsych" and "lab.js." Researchers can store their work on Pavlovia's repository, manage versions, track issues, and communicate with colleagues. The platform ensures secure data handling with encrypted connections and offers various participant recruitment options. Pavlovia's open architecture and commitment to open science make it a valuable resource for the research community. Pavlovia is also an excellent tool for teaching because it allows students to design, run, and analyze experiments in a user-friendly online environment. Instructors can use Pavlovia to create interactive and engaging coursework to help students gain hands-on experience with real research methods.
- **The Shaping Game**⁷⁴: This game allows students to design psychology experiments and practice with some operant conditioning principles, such as the effects of positive reinforcement, positive punishment, superstitious behavior, and operant extinction, with little additional equipment.⁷⁵ A simple application of the shaping game may be where the shaper (student A) manipulates the movement behavior of the learner (student B) via the clicker or a piece of candy as conditioning reinforcers. The learner "may start by standing away from the chairs in the room. As the learner leans, looks, or moves toward a chair, the shaper [may]

⁷⁰Hummel HGK, Nadolski RJ, Eshuis J, Sloomaker A, Storm J. Serious game in introductory psychology for professional awareness: Optimal learner control and authenticity. *Br J Educ Technol*. 2021; 52, 125-141. <https://doi.org/10.1111/bjet.12960>.

⁷¹Shields C, Gredle M. A problem-solving approach to teaching operant conditioning. *Teach Psychol*. 2003; 30, 114-116. http://dx.doi.org/10.1207/S15328023TOP3002_06.

⁷²Chrisler JC. Conditioning the instructor's behavior: A class project in psychology of learning. *Teach Psychol*. 1998; 15, 135-137.

⁷³ Pavlovia. Accessed January 20, 2025. <https://pavlovia.org/#main>

⁷⁴Morgan WG. The shaping game: A teaching technique. *Behav Ther*. 1974; 5, 271-272. [https://psycnet.apa.org/doi/10.1016/S0005-7894\(74\)80144-9](https://psycnet.apa.org/doi/10.1016/S0005-7894(74)80144-9).

⁷⁵Swisher M. Teaching Operant Conditioning Principles via Virtual reality and In-Class Demonstrations. May 31, 2023. Accessed July 18, 2023. <https://science.abainternational.org/2023/05/31/teaching-operant-conditioning-principles-via-virtual-reality-and-in-class-demonstrations/>.

provide a click as a reinforcer."⁷⁶ With time, the learner should recognize the conditioning reinforcers, which exhibit more movement towards a chair and eventually sitting in the chair (target behavior).

- **The Portable Operant Research and Teaching Laboratory (PORTL)**⁷⁷: This is an interactive educational game designed to simulate Skinner's operant chamber without exploiting animals. PORTL helps students learn about operant conditioning and other behavioral principles such as reinforcement, punishment, shaping, and extinction.⁷⁸ It uses "a collection of small objects, a clicker to select behavior, and small blocks as reinforcers."⁷⁹ Students need only minimal instructions to start playing. However, as they gain more experience with the game, they can use it to [tackle more] complex questions.⁸⁰ "This gives them a sense of discovery and [excites them] to learn more about how behavior works."⁸¹ Outside the classroom, PORTL is a valuable resource for conducting basic research with human participants in research and clinical settings.⁸²
- **Open Access Data Analysis**: Data literacy is an essential skill set for the twenty-first century.⁸³ Educators can help students explore psychological themes and develop transferable analytical skills by having them analyze open data sets through visualization and statistical inference. For instance, traffic violation records can be used to study repeated offense behaviors, while reward program participation records can help examine compulsive buying disorder.⁸⁴ Numerous open-access repositories allow educators to access diverse data on various psychology topics, enabling them to design unique activities with real-world relevance.⁸⁵
- **Field studies**: Traditional laboratory studies often fail to capture the full extent of animal cognitive processes, which have evolved in natural settings. To understand these processes, we must examine them in the context of the animals' natural environments.⁸⁶ Harm-free field studies outside a controlled laboratory setting require a research plan at the outset.⁸⁷ Designing a field research strategy compels students to review the existing work in a given field, form testable hypotheses, decide which data type to collect, and select relevant statistical tests. This approach to teaching psychology is comparable in its value to traditional classroom methods. For instance, students observing wild pigeons in a city park received evaluation scores similar to those of students who studied operant conditioning using rats in a

⁷⁶*Ibid.*

⁷⁷ Hunter M, Rosales-Ruiz J. What is PORTL? Behavior Explorer. Published 2019. Accessed November 6, 2024. <https://behaviorexplorer.com/articles/portl-intro/>.

⁷⁸ Goodhue RJ, Liu SC, Cihon TM. Incorporating the portable operant research and teaching laboratory into undergraduate introduction to behavior analysis courses. *J Behav Edu.* 2019; 28(4), 517–541. <https://doi.org/10.1007/s10864-019-09323-y>.

⁷⁹ Hunter M, Rosales-Ruiz J. What is PORTL? Behavior Explorer. Published 2019. Accessed November 6, 2024. <https://behaviorexplorer.com/articles/portl-intro/>.

⁸⁰*Ibid.*

⁸¹*Ibid.*

⁸² Goodhue et al. 2019.

⁸³ Coughlan T. The use of open data as a material for learning. *Education Tech Research Dev.* 2020; 68, 383–411.

⁸⁴ Cornell D. 13 Operant Conditioning Examples. Helpful Professor. May 13, 2023. Accessed July 18, 2023. <https://helpfulprofessor.com/operant-conditioning-examples/>.

⁸⁵ PsychArchives. Disciplinary Repository for Psychological Science. Accessed July 18, 2023. <https://psycharchives.org/>.

⁸⁶ Pritchard DJ, Hurly TA, Tello-Ramos MC, Healy SD. Why study cognition in the wild (and how to test it)? *J Exp Anal Behav.* 2016; 105(1), 41-55. doi: 10.1002/jeab.

⁸⁷ Sœur C, Zanz S, Pelé M. Incorporating animal agency into research design could improve behavioral and neuroscience research. *J Comp Psychol.* 2023;137(2), 129-143. doi: [10.1037/com0000335](https://doi.org/10.1037/com0000335).

traditional laboratory.⁸⁸ In addition, having students in psychology-of-learning courses work with animals in an animal shelter offers many benefits that are not available in classroom animal laboratories. These include applying science in everyday situations and providing valuable community service (e.g., stress alleviation and sociability training in companion animals and rehabilitated wildlife).^{89,90,91}

Request for Action

There is no legal, scientific, or ethical justification to harm animals to prepare students for careers in brain science. It is also critical that young psychologists and neuroscientists discuss the problems associated with animal use in education and are given a plethora of nonanimal tools. Otherwise, we risk fostering a "culture of disengagement" regarding public welfare issues⁹² or alienating talented and compassionate people from the field.

We request that your institution adopt a public policy on your psychology department's website prohibiting the use of animals in undergraduate psychology curricula. Our suggested public policy language is: "*The psychology program at Utah State University does not use animals for educational purposes and instead uses nonanimal methods for curricular laboratories.*"

⁸⁸Cohen PS, Block M. Replacement of laboratory animals in an introductory-level psychology laboratory. *Hum Innov Altern.* 1991; 5, 221-225. <https://www.interniche.org/et/studies/replacement-laboratory-animals-introductory-psychology-laboratory>.

⁸⁹Flaisher-Grinberg S. For the love of dogs: An academia-community partnership targeting a mutual goal. *J Center Interdiscip Teach Learn.* 2021; 9(1), 8-15. <https://d-scholarship.pitt.edu/44363/1/Rescued%20is%20My%20Favorite%20Breed.pdf>.

⁹⁰McDonald TW, Caso R, Fugit D. Teaching and learning operant principles in animal shelters: Perspectives from faculty, students, and shelter staff. *J Instr Psychol.* 2005; 32(4), 310-321. https://scholarworks.boisestate.edu/commhealth_facpubs/10/.

⁹¹Back to Shool Operant Conditioning with Tigers. Carolina Tiger Rescue. Accessed July 18, 2023. <https://carolinatigerrescue.org/newsroom/back-to-school/>.

⁹²Cech EA. Culture of Disengagement in Engineering Education? *Sci Technol Human Values.* 2014; 39(1): 42–72. [doi:10.1177/0162243913504305](https://doi.org/10.1177/0162243913504305).