

The 3Rs Collaborative's 2023 Impact Report



**Better science -
for both people & animals**

Table of Contents

Introduction to the 3RsC **3**

Leadership & Staff **5**

By the Numbers **6**

Broadening 3Rs Support **7**

Advancing Critical 3Rs Techniques **10**

Expanding Awareness of the 3RsC **15**

Financial Report & Member Summary **16**

Impacts, Members, & Donors **18**



Introduction



Advancing better science – for both people and animals.

We facilitate collaborative 3Rs opportunities to make a positive impact using evidence-based science for people and animals in research and teaching.

We work to:

- Refine: Improve the lives of animals used in research and teaching
- Reduce: Minimize animal numbers while maximizing scientific output
- Replace: Promote the widespread adoption of non-animal models

Our work is grounded in the real world, practical experiences to initiate the most progress in the shortest amount of time.

Introduction

OUR VISION

Uniting scientific excellence and animal welfare.

We strive to create a future where:

- All research animals consistently receive the best care possible throughout their lifespan to maximize their welfare—regardless of size or species.
- All animal experiments and science-related breeding programs are designed to maximize quality, including reproducibility and translation, while minimizing the numbers of animals required across the research pipeline.
- All scientifically valid replacement technologies are consistently implemented whenever appropriate throughout the scientific and teaching pipeline so that animals are only used when absolutely necessary.
- All individuals working in animal research and teaching feel supported to do their best work for their research animals and scientific progress.

Ultimately, science, knowledge, and respect for all beings are advanced.



OUR VALUES

1. **Evidence:** We make decisions based on high-quality, data-driven, evidence-based science.
2. **Collaboration:** We work across disciplines and incorporate information from different backgrounds. The output of the group is greater than that of one.
3. **Impact:** We make an impact through the 3Rs on scientific research. We are outcome driven, constructive, and practical.

3RsC Leadership & Staff - 2023

Executive Team



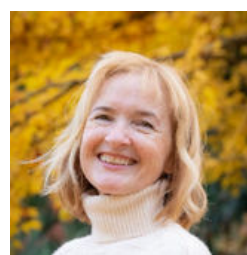
Past President

Ben Cappiello
AxoSim



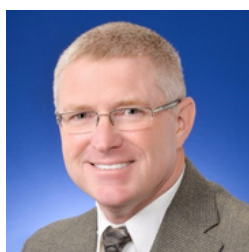
President

Elizabeth Nunamaker
Charles River



Vice President

Sally Thompson-Iritani
University of Washington



Treasurer

Jerry Poling
Lilly



Secretary

Melissa Truelove
Emory

Board Members

Alan Hoberman, Charles River
Chris Manuel, University of Colorado Anschutz
Clive Roper, Roper Toxicology
James Curry, Former Zoetis
Jessie Carder, USDA-AWIC

Joseph Garner, Stanford University
Laura A Conour, Princeton
Noel Dybdal, Genentech
Meaghan Loy, Scientist.com
Shayna Halverson, AltaSciences

Ad Hoc Board Members

Armand Mensen, Swiss3RCC
Naomi Charalambakis, FASEB

Natalie Bratcher, Murine
Vicky Robinson, NC3Rs

Staff

Megan LaFollette, Executive Director
Lauren Young, Program Manager

3RsC By The Numbers

Thanks to the vital support of our members, the 3Rs Collaborative has made important gains in advancing better science – for both people and animals. We are ensuring that research animals receive the best care, with the best designed experiments, and replaced when scientifically feasible.



Founded in
2017



7
Core Initiative
Topics



>200
Volunteers



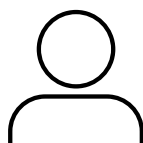
63
Resource Pages



30
Institutional
Members/Donors



45
Initiative
Members/Donors



42
Individual
Members/Donors



>8000
Animals
Replaced



9
Conferences



>30
Presentations



3
RFI Responses



Broadening 3Rs Support

The 3RsC's first strategic goal is to broaden 3Rs support.

We are creating a research landscape that is knowledgeable and supportive of the 3Rs. Our strategy is to promote broad knowledge of the 3Rs while supporting workplace wellness and culture of care. One example of our success? More than ten different institutions are using our resources to launch their own internal compassion fatigue resiliency programs.



Advancing broad knowledge of the 3Rs across stakeholders

The 3RsC is creating a 3Rs certification course for broad stakeholder use, from students to care technicians to researchers. In 2023, we finished initial revisions of all 5 modules for the course, including creating graphics, formatting references, and developing quiz questions. We also had important discussions related to pricing, software, and course hosting.

Why a Certification Course?

Although most animal research professionals have learned about the 3Rs briefly, they may lack in depth information on their application. Furthermore, there is no singular, comprehensive, or standardized training. A virtual, self-paced certification course will increase general knowledge, support, and practical implementation for the 3Rs across diverse stakeholders.

Next Steps

In 2024, we are putting the finishing touches on our certificate course and establishing a partnership with the CITI Program to host the course. After transferring content into interactive, user-friendly software, we will formally launch and market our course broadly.

Broadening 3Rs Support

Supporting workplace wellness & culture of care

Ultimately, the implementation of the 3Rs is dependent on those working in science. Although this work can be deeply meaningful, it often comes with real challenges including typical workplace concerns such as poor work-life balance and difficult relationships with peers, as well as field-specific concerns such as social stigma and seeing research animals in distress when necessary for research goals.

**Caring for Our People.
Caring for Our Animals.**

Working with research animals can lead to compassion fatigue.

We know you care deeply for our research animals and advancing science. Our work is rewarding, but it can also come with challenges:

- Euthanasia of animals
- Potential animal pain/distress
- Difficulty publicly talking about your work
- Difficulty connecting with others
- Feeling undervalued by society

All of this & more can lead to feeling stressed & burnt out.

3RC

Together we can support resiliency.

- Compassion fatigue awareness
- Culture of care
- Work/life balance
- Connections between staff
- The 3Rs & animal welfare
- Self-care including mindfulness & more

na3rsc.org/cf

Since 2020, the 3Rs Collaborative has been promoting workplace wellness and a culture of care in scientific institutions. We've created 6 individual and 8 institutional resources.

In 2023 we:

- Submitted benchmarking results from our 3-year longitudinal survey that showed a link between retention & professional quality of life
- Received a grant from PTOP to revise & expand our institutional resources including those related to culture of care
- Contributed to 18 presentations, a media article in Science with corresponding podcast, and spoke to Canadian media



**Longitudinal
Survey**



**Starter Pack
& Resources**



**Interactive
Webinars**



Poster

Broadening 3Rs Support

Fostering continuing education on the 3Rs

Knowledge around evidence-based, high-impact 3Rs techniques is always expanding. Therefore, the ongoing continuing education of professionals is critical to ensure good understanding of 3Rs techniques, strategies, and resources. This training promotes good animal welfare, experimental practices, and translation of research findings.

As part of its training efforts, in 2023 the 3Rs Collaborative:

- Organized a 3Rs Sharing Conference with the New Jersey Association for Biomedical Research, facilitating learning and discussion about the 3Rs across stakeholders. This conference featured 9 talks and 70 attendees. It's unique for being a single-track conference across the 3Rs
- Disseminated >35 newsletters and >60 social media posts to help enable greater support of the 3Rs
- Contributed to over 30 presentations at 9 conferences that reached a variety of stakeholders
- Hosted 64 practical enabling 3Rs resources on our website.



Advancing Critical 3Rs Techniques

The 3RsC's second strategic goal is to advance critical 3Rs techniques.

The 3RsC devotes significant time and energy to advancing critical 3Rs techniques that are evidence-based, practical, and high-impact. After choosing the right topics and leaders, we work to thoroughly understand the status quo before creating strategic resources to accelerate widespread implementation. Our efforts are grounded in human and organizational behavior change theories.

Refined Mouse Handling to Improve Welfare

Mice - the most common research mammal - experience stress when picked up by the tail, but research shows that picking them up with refined methods can significantly reduce animal anxiety and improve research outcomes.

In 2023 we:

- Published baseline data from our 3-year study. We found that in 2021 few people used refined handling exclusively primarily due to misconceptions about its compatibility with jumpy mice and restraint, and concerns with time.
- Ran year 3 of survey data collection
- Finalized & launched a Refined Mouse Handling certification course in coordination with NC3Rs
- Created & launched an extensive resource hub including information for common concerns such as biosecurity & time
- Conducted 4-hands on workshops & 14 presentations



Looking ahead to 2024, we will focus on conducting a systematic literature review and continuing workshops, presentation, and education efforts.

Advancing Critical 3Rs Techniques

Advancing the use of Microphysiological Systems (MPS)

MPS are an impactful technology that allows researchers to study biological processes by creating miniature versions organs. We work with an initiative of >30 commercial providers, 2 consultants, and 9 additional stakeholders to advance their implementation and regulatory use.

In 2023 we:

- Established a formal consortium agreement with the FDA-CDER
- Conducted formal communication with government agencies including the NIH and FDA including responding to RFIs and presenting at the NIH Workshop on NAMs
- Organized 5 presentations from the 3RsC and 4 workshops from our members on the topics of using MPS for blood-brain barrier, vascular, GI, and lung applications. These workshops each had >175 registrants and >5000 recording views
- Added filters for disease area & species to our MPS tech hub that connects end-users with tech providers
- Welcomed 6 new members to our initiative
- Expanded our MPS Website hub with information on the FDA Modernization Act & presentation page



Advancing Critical 3Rs Techniques

Replacing Sentinel Mice with Environmental Health Monitoring (EHM)

Advancements in PCR technology now make it possible to completely replace the use of soiled bedding sentinel mice to monitor colony mouse health. However, more work is needed to share this message and help institutions transition their programs

In 2023 we,

- Organized 4 presentations to encourage change and address barriers
- Expanded and updated our online resource hub with a cost analysis, research priorities, sanitation, implementation tips, & how to switch.
- Wrote a letter to the editor addressing concerns about a publication that could inhibit progress of sentinel replacement.
- Published benchmarking data from our 3-year longitudinal study of rodent health monitoring. Results from 2021 showed that few institutions used EHM exclusively due to concerns with compatibility with current caging and lower accuracy.
 - We have addressed these concerns with education over the past years!
- Updated our systematic review with 9 new publications and re-submitted it.



Advancing Critical 3Rs Techniques

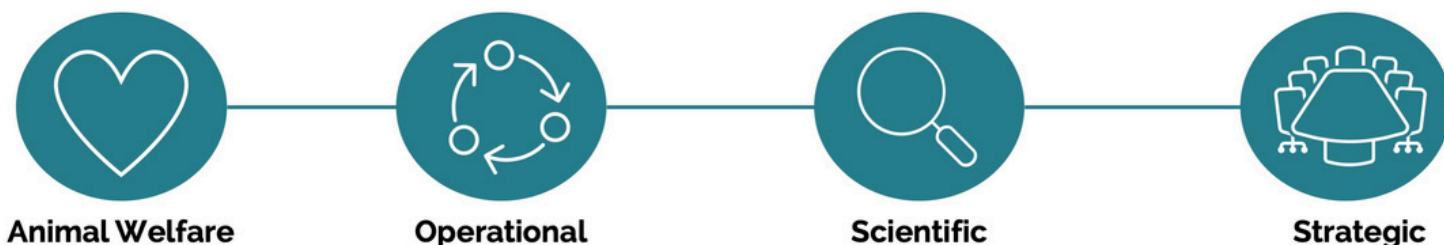
Advancing Science & Welfare with Translational Digital Biomarkers

With the advent of 24/7 monitoring systems for animal behavior and physiology, it is now easier than ever to develop digital biomarkers that are translational. However, despite the enormous potential for this technology to advance better science, more is needed to be done to advance its implementation and regulatory use. Our translational digital biomarkers initiative brings end-users and technology providers together in a pre-competitive space to work together for mutual benefit.

In 2023 we,

- Launched a technology hub to connect end-users with commercial providers
- Organized 3 presentations to advance the use of these important technologies
- Began drafting a new manuscript on a validation framework for using in vivo digital measures for preclinical research
- Increased regular posts about translational digital biomarkers (TDB) on LinkedIn.

Why should we use translational digital biomarkers in drug discovery & development?



Below you can see a screenshot of our newly launched TDB technology hub

Below you can explore Translational Digital Biomarker technologies that are currently available. Use the filters below to sort the technologies by **Species**, usable **Environment**, **Readouts** and potential **Scalability**. Use the outreach buttons to contact individual technology providers for the answer to questions, inquires about products or services, and key validation and publications related to each specific TDB technology.

Translational Digital Biomarker Technologies

Species

 ▾

Environment

 ▾

Readouts

 ▾

Scalability

 ▾

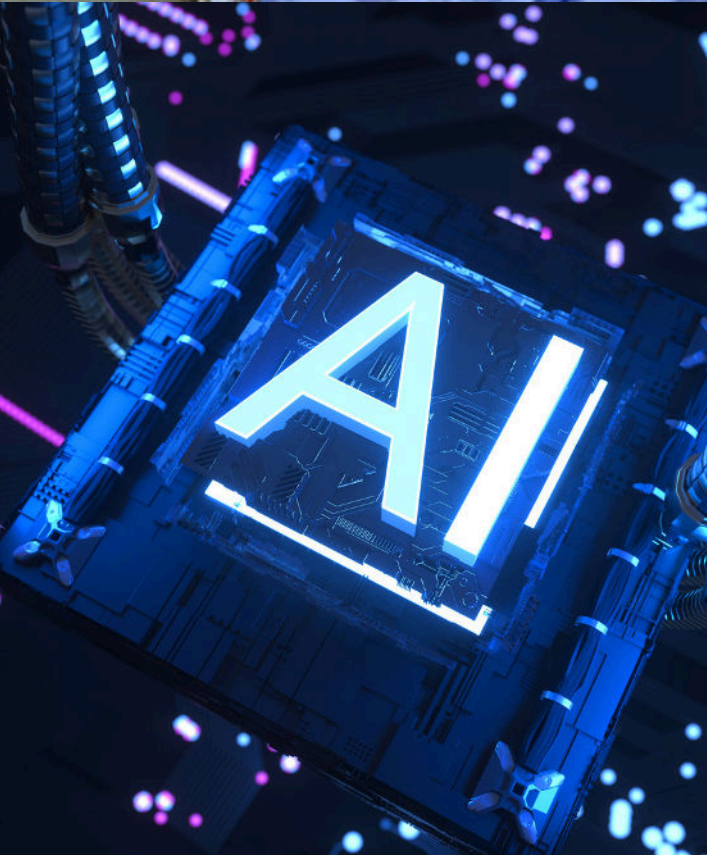
Advancing Critical 3Rs Techniques



[NEW: Improving Non-Human Primate Welfare](#)

In 2023, we launched an initiative focused on the refinement of non-human primates in North America. Although non-human primates make up less than 1% of research animals, they are critical in research and essential to focus on improved welfare. Our newest initiative focuses on practical and actionable ways to improve their welfare through behavioral management.

Their first effort will be writing a review paper on this topic.



[NEW: Artificial Intelligence for Risk Assessment & Safety](#)

In recent years, artificial intelligence has become increasingly common and useful in all our lives. Similarly, it has the potential to be very impactful to the 3Rs of animal research. So, in 2023, we launched an initiative focused on the use of artificial intelligence in safety and risk assessment. This initiative is co-led by Szczepan Baran (VeriSim Life) and Weida Tong (FDA) and currently includes 21 individuals from institutions such as AbbVie, Charles River Laboratories, EPA, HESI, Novartis, NIH/NIEHS, Pfizer, Novartis, and more.

Expanding Awareness of the 3RsC

The 3RsC's third strategic goal is to advance awareness of our organization.

The 3Rs Collaborative provides a wide range of resources to increase understanding and implementation of the 3Rs. These resources help individuals and institutions change practices for the better. Still, there are many more individuals and institutions that could benefit from our resources but are unaware of them.

Increased awareness and dissemination of our organization and resources helps accelerate the implementation of the 3Rs across the national and international scientific community.

In 2023, we fostered awareness and collaboration with key stakeholders by:

- Contributing over 30 presentations at 9 conferences or events
- Meeting and collaborating with over 10 critical stakeholders including the FDA-CDER, IQ-MPS, NC3Rs, Swiss 3RCC, NWABR, NJABR, US NIH - OLAW, NTP, NICEATM, and FDA Alternatives methods working group.
- Publishing >35 newsletters and >60 social media posts

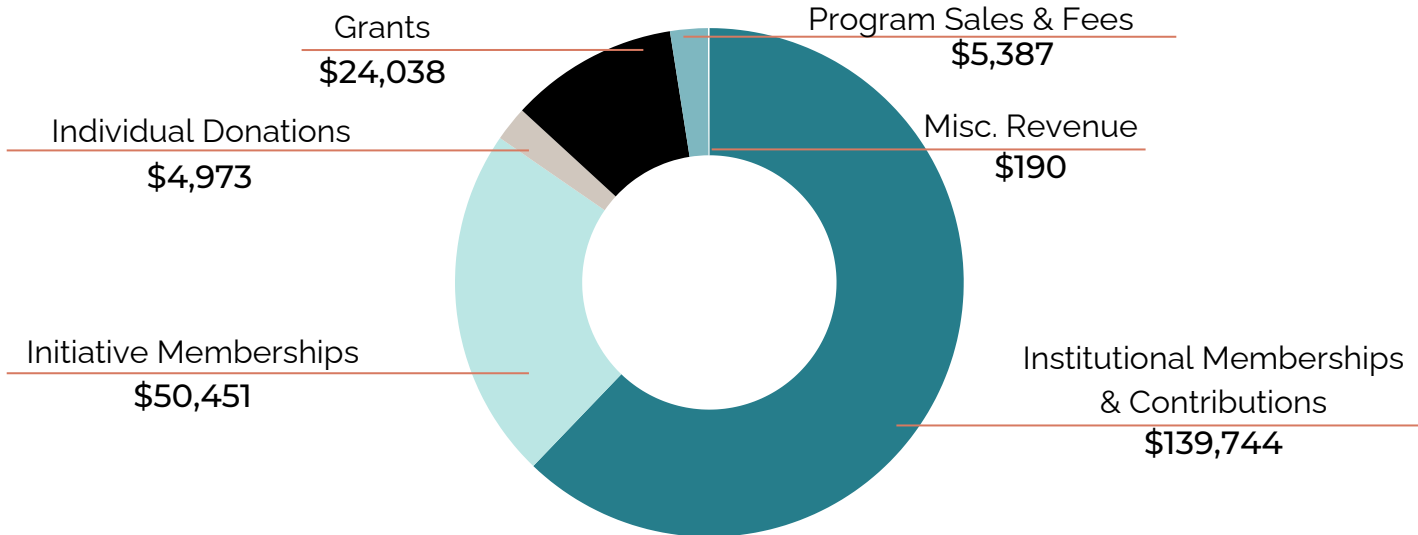


Financial Report

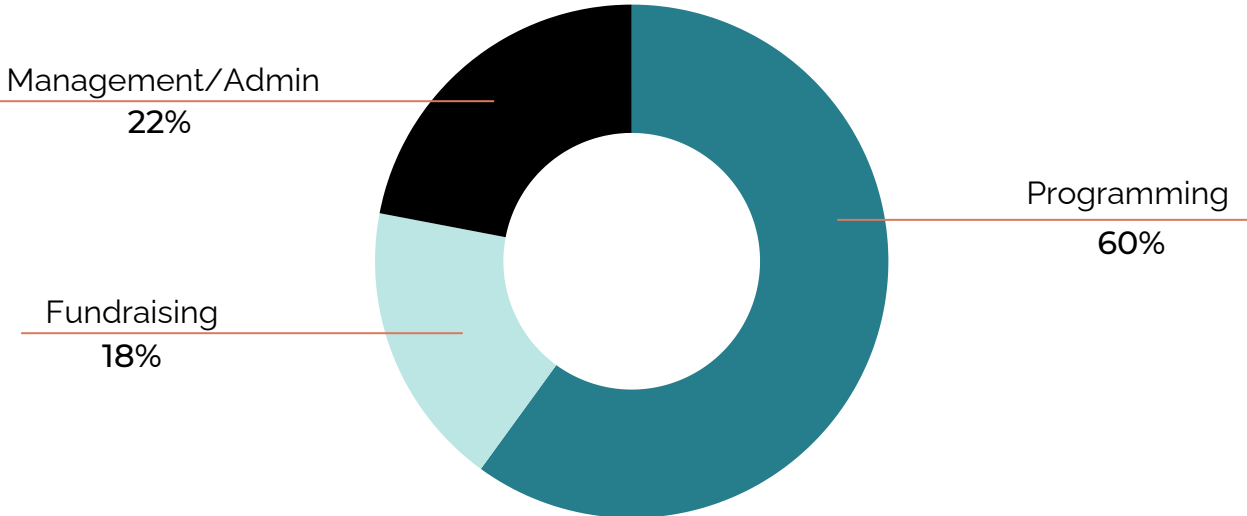
The 3Rs Collaborative's operating funds come from 5 main sources: institutional memberships/contributions, initiative memberships, individual donations, grants, and program sales & fees. Our expenses fall into 3 main expense categories: programming, fundraising, and overall administration & management. At year end, our total assets were \$198,828 and our total liabilities were \$7,960.

In 2023, our total revenue was \$224,782 and 60% of funds were spent on programming.

Financial Support



Expense Categories



Membership & Donors

The 3Rs Collaborative thanks each of our members, grantors, and donors for their commitment to our mission. At the end of this report, we've listed everyone according to their wishes. We are so grateful for your partnership in advancing better science – for both people & animals.

119
Total Members/Donors

6
New Members/Donors

113
Retained Members/Donors

95% Retention Rate

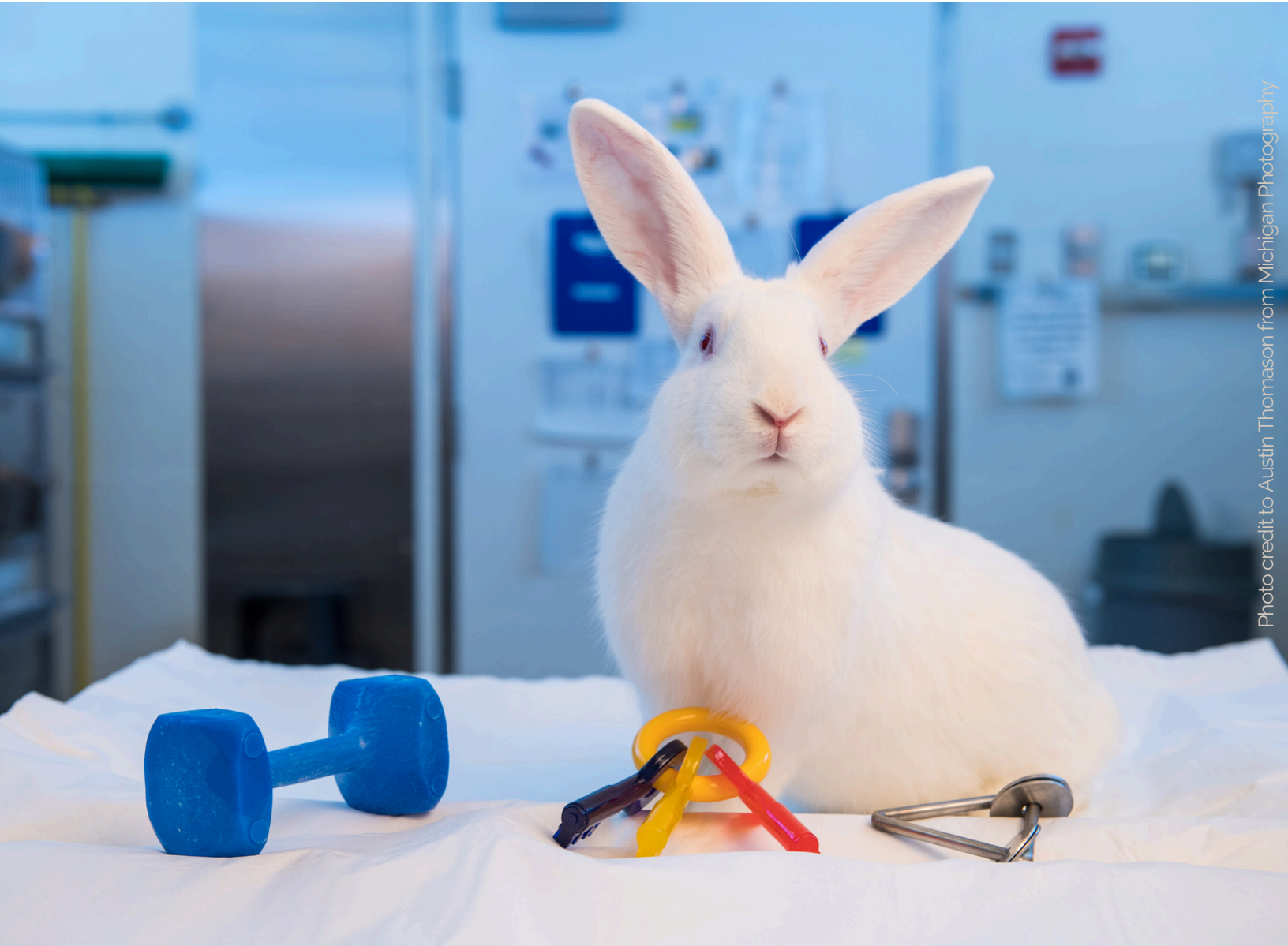


Photo credit to Austin Thomason from Michigan Photography

Impacts by The Numbers

Inputs: Activities & Resources Provided by the 3RsC

General 3Rs Training & Resources

- 63 of General Resources

Symposia, Presentations, and Other Events

- Hosted 1 Conference & 4 Workshops
- Attended 19 additional Events
- >30 Presentations

Specific 3Rs Initiatives

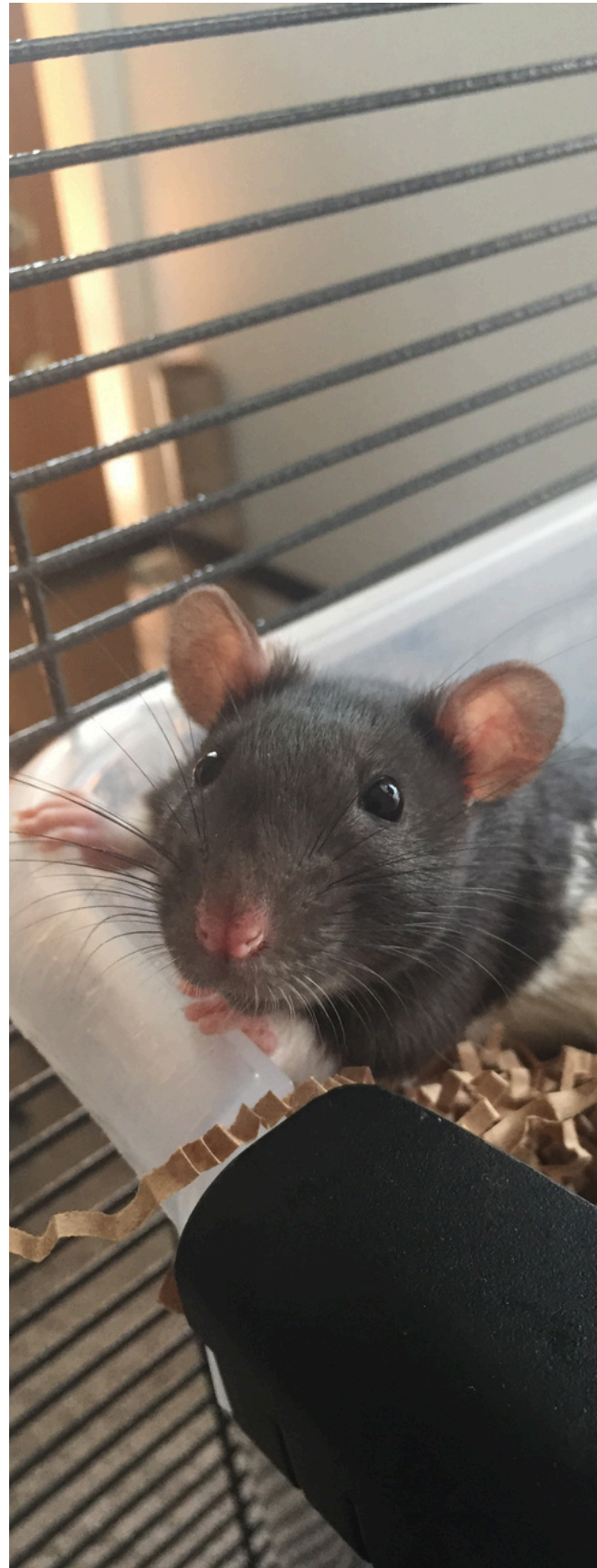
- 7 Initiatives

Collaboration with Other Organizations and Individuals

- >10 Collaborating Organizations
- >150 of Collaborating Individuals

Information Resources

- 63 Resources
- 35 of Newsletters



Impacts by The Numbers

Outputs & Outcomes: Initial Results

Improved understanding and awareness of the 3Rs

- >2000 Individuals at Events
- Positive Feedback

Creation of new 3Rs knowledge

- 9 new resources
- 2 new publications

Development of collaborative and mentoring networks.

- >75 of collaborations as shown by exchange of information

Dissemination activities

- >3500 of newsletter subscribers
- >73,000 website views from >35,000 visitors
- LinkedIn: 3,566 followers, 62 posts, 42,276 Impressions, 5.8% engagement rate

Photo credit: to Ellegaard Gottingen Minipigs



Impacts by The Numbers

Interim Impacts: Changes in perception, policy, and practice

Increased 3Rs audience and knowledge

- >75 Institutions working with 3RsC

Uptake of key 3Rs techniques

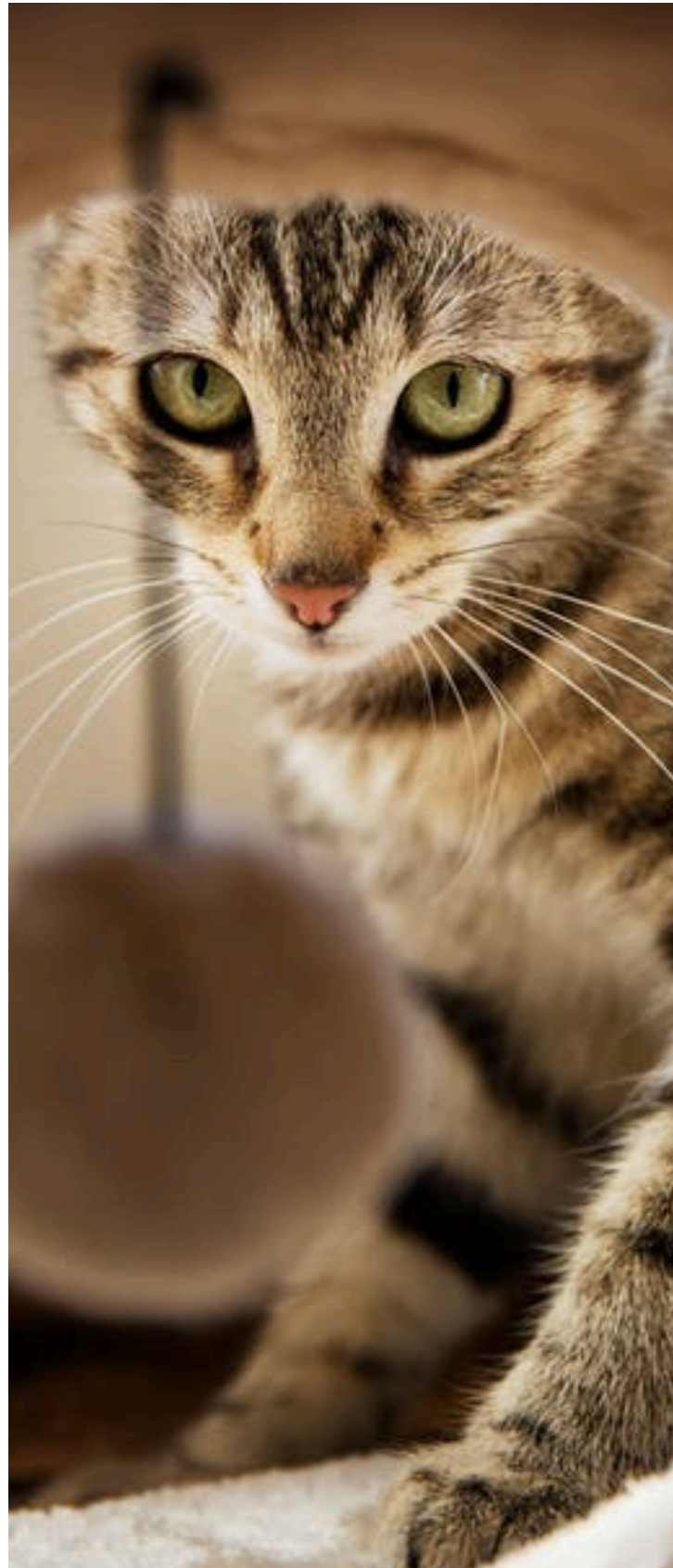
- >15 of Institutions adopting techniques promoted by 3RsC

3Rs and culture of care embedded in institutional culture

- >10 institutions referencing the 3Rs and CoC in formal documentation

The 3RsC as a trusted source for 3Rs Information

- >10 of institutions consulting with the 3RsC
- 10 of invited staff presentations
- >73,000 website views from >35,000 visitors
- 30 institutional members



Impacts by The Numbers

Mature Impacts

Refinement linked to 3RsC

- Improved housing and handling.
- Objective indicators of improved welfare

Reduction linked to 3RsC

- Fewer animals used per experiment, including animals bred for that experiment, and/or more data per animal

Replacement linked to 3RsC

- >8000 fewer animals used in the scientific pipeline

Better Science linked to 3RsC

- More predictive and translatable science. More discoveries.



Thank You to Our Members!

Our institutional members and funders are 3Rs leaders and make our work possible!

GOLD: \$10,000+/\$5,000+



SILVER: \$5,000+/\$2,500+



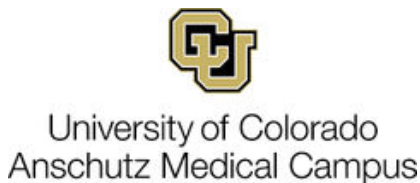
FDA

Princeton University

Thank You to Our Members!

Our institutional & initiative members are 3Rs leaders and make our work possible!

BRONZE: \$1,000/\$500



EHM Initiative Members: \$1000



TDB Initiative Members: \$1000



Thank you to all our new Artificial Intelligence members!

Thank You to Our Members!

MPS Initiative Members



Thanks to all members of our Compassion Fatigue, 3Rs Certificate Course, Environmental Health Monitoring, & Refinement Initiatives!

Thank You to Our Individual Donors!

Our individual donors are an important part of our organization with their contribution to the 3Rs. We thank both those listed below and many more anonymous donors.

Gina Alvino
Eric Balboa
Linda Bryan
Laura Conour
Jim Curry
Noel Dybdal
Derek Fong
Sandra Gracia
Karen Gourlay
Matthew Grant
Robert Gump
Carey Hannan
Ken Henserson
Jorge Hernandez

Alan Hoberman
Megan LaFollette
Meaghan Loy
Kerith Luchins
Chris Manuel
Monika McDole-Russell
Elizabeth Nunamaker
Norman Peterson
Clive Roper
Mandi Taylor
James Taylor
Sally Thompson-Iritani
Elizabeth Tobey
Melissa Truelove

