The 3Rs Collaborative's
2024 Impact Report


Photo credit to University of Washington

Better science -
for both people & animals

Table of Contents

Introduction to the 3RsC 4

Leadership & Staff 6

By the Numbers 7

Broadening 3Rs Support 8

Advancing Critical 3Rs Techniques 11

Expanding Awareness of the 3RsC 17

Financial Report & Member Summary 18

Impacts, Members, & Donors 19

Shaping the Future: Science, Ethics, & the 3Rs In Action

As we review another impactful year at the 3Rs Collaborative (3RsC), I am proud to reflect on the strides we have made in advancing better science—for both people and animals. A major milestone this year has been the launch of the 3Rs Certification Course. This first-of-its-kind, self-paced training program is now live, providing researchers, students, and animal care professionals with the knowledge and tools needed to embed the 3Rs principles (Refinement, Reduction, and Replacement) into everyday practice. Through our partnership with CITI Program, we have made this essential training widely accessible, ensuring that the next generation of scientists and research professionals are equipped to uphold the highest standards in ethical and high-quality research.

Beyond this, 2024 has been a year of combinatorial impact, where our initiatives have intersected to create systemic change in research and animal welfare. From refining mouse handling practices and advancing microphysiological systems (MPS) to fostering mentorship networks and leading in Artificial Intelligence for Risk Assessment and Safety, we have strengthened the foundation for more ethical, reproducible, and translatable science.

Our commitment to collaboration remains at the heart of our success. By working with regulatory agencies, research institutions, and industry leaders, we have expanded the reach of high-impact, evidence-based 3Rs practices. One standout example is the growing adoption of compassion fatigue resiliency programs—with more than ten institutions now using our resources to support workplace wellness and a culture of care. Looking ahead, we are excited to build on this momentum, expanding awareness of the 3Rs Certification Course, deepening our work in emerging technologies, and continuing our mission of uniting scientific excellence with animal welfare.

None of this progress would have been possible without the dedication of our members, donors, and volunteers. Your support has fueled our ability to turn vision into action. Together, we are not just advocating for the 3Rs—we are embedding them into the very fabric of scientific research.

Thank you for being part of this journey. Here's to another year of better science, better welfare, and a better future.

With appreciation,
Sally Thompson-Iritani, DVM, PhD
President, 3Rs Collaborative
University of Washington

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 - 2024

Executive Team

Past President
Elizabeth Nunamaker
Charles River

President
Sally Thompson-Iritani
University of Washington

Vice President
Szczepan Baran
VeriSim Life

Treasurer
Jerry Poling
Lilly

Secretary
Melissa Truelove
Emory

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Naomi Charalambakis, FASEB, AMP
Natalie Bratcher, Murine
Nicolette Petervary, OLAW-NIH
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**

8 Core Initiative Topics

>240 Volunteers

70 Resource Pages **(6 new!)**

35 Organizational Members/Donors

65 Initiative Members/Donors

42 Individual Members/Donors

>8500 Animals Replaced

9 Conferences

>20 Presentations

2 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 has created a 3Rs certificate course for broad stakeholder use, from students to technicians to researchers. In 2024, we finalized a formal partnership with CITI program to host our training course, finalized pricing, got the course put in the software, and put all the final touches on the course so it was prepared to launch in January of 2025.

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

We are officially launched the 3Rs Certificate Course in January of 2025. This year we are marketing it broadly to our members, newsletter subscribers, and other community members. We will collect initial engagement statistics to track impact and feedback to help make the course even better in the future.

Broadening 3Rs Support

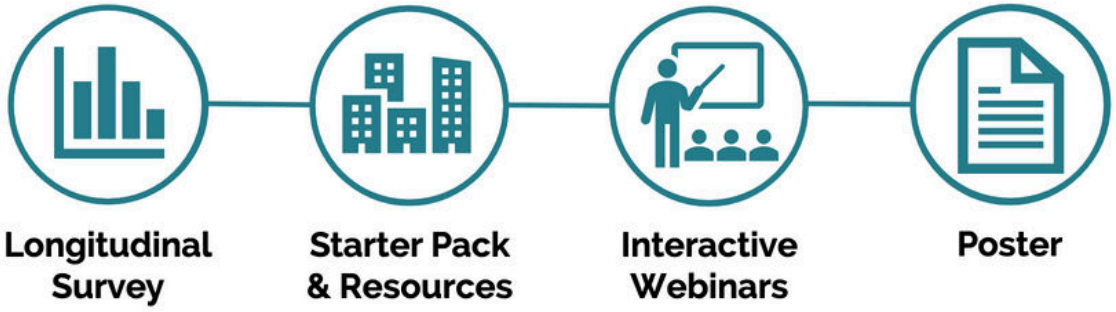
Supporting workplace wellness & culture of care

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.

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 2024 we:

- Published benchmarking results from our 3-year longitudinal survey that showed a link between retention & professional quality of life
- Collected responses to the final year of our longitudinal investigation of institutional programs and began analysis on this data
- Revised & updated our institutional resources to include peer-to-peer training & managerial support materials
- Contributed to 14 presentations at 12 different events across the US, Canada, & Europe



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 10 talks and >70 attendees. It's unique for being a single-track conference across the 3Rs
- Disseminated >60 newsletters and >130 social media posts (twice as many as in 2023) to help enable greater support of the 3Rs
- Contributed to over 20 presentations at 9 conferences that reached a variety of stakeholders
- Hosted 70 practical enabling 3Rs resources on our website including 6 brand new information pages!

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 2024 we:

- Started conducting a systematic review of refined mouse handling. We submitted a protocol, finalized and conducted a literature search, screened all papers for inclusion, and began data extraction and bias assessment
- Launched a refined handling mentorship program with 9 individuals signing up and conducted 2 mentorship meetings
- Expanded our resource hub adding pages on (a) time & other common concerns and (b) workshops & a training guide
- Conducted 2 hands-on workshops & 8 presentations

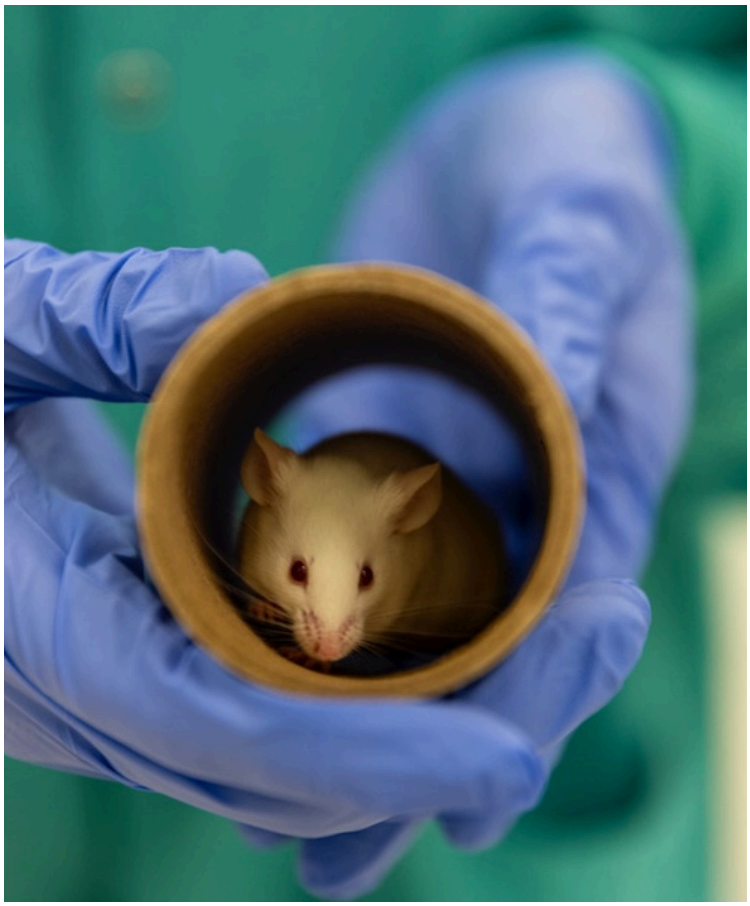


Photo credit to University of Washington

Looking ahead to 2025, we will focus on finishing our systematic literature review, strengthening our mentorship program, 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 of whole organs (usually, but not always, incorporating human cells). We work with an initiative of 45 commercial providers, 2 consultants, and 3 additional stakeholders to advance the implementation and regulatory use of MPS.

In 2024 we:

- Launched a project under our consortium agreement with the FDA-CDER which includes the 10 commercial providers, C-PATH, and NICEATM working together on a cross-platform project on a specific context of use for drug-induced liver injury
- Organized 6 presentations from the 3RsC including to SACATM, ICCVAM, C-Path, HESI, and the IQ-MPS
- Organized 4 workshops on the topics of immune competent and lymph node MPS, neurodegenerative & fibrosis MPS, oncology MPS, and MPS cells and suppliers. Each workshop had >175 registrants and >5000 recording views. View here.
- Published 4 ALTEX Corners on behalf of the 3RsC-MPS initiative
- Welcomed 17 new members to our initiative expanding our MPS Tech Hub
- Published an update on facts about the FDA Modernization Acts & MPS
- Submitted & revised our publication titled "The Use of MPS in Three Rs and Regulatory Applications: Perspectives From Developers on Stakeholder Responsibilities"

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 2024 we:

- Launched a EHM mentorship program that engaged 8 mentees that want to help their institution switch to EHM.
- Organized 2 presentations to encourage change and address barriers to replacement
- Expanded and updated our free EHM resource hub with a page on using EHM for rats & other species and to highlight our mentorship program
- Facilitated a portion of our members writing a pathogen exclusion consensus paper.
- Revised, re-submitted, and published our paper titled "Do we still need a canary in the coal mine for laboratory animal facilities? A systematic review of environmental health monitoring versus soiled bedding sentinels"

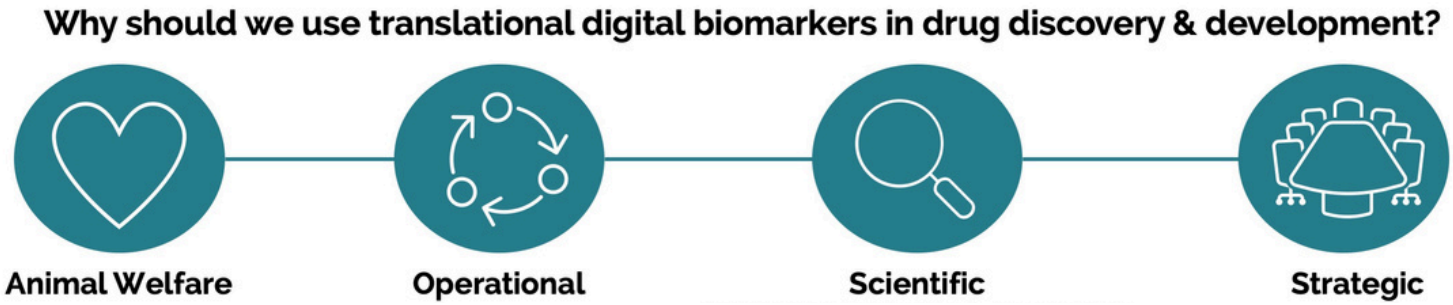
Advancing Critical 3Rs Techniques

Advancing Science & Welfare with Translational Digital Biomarkers

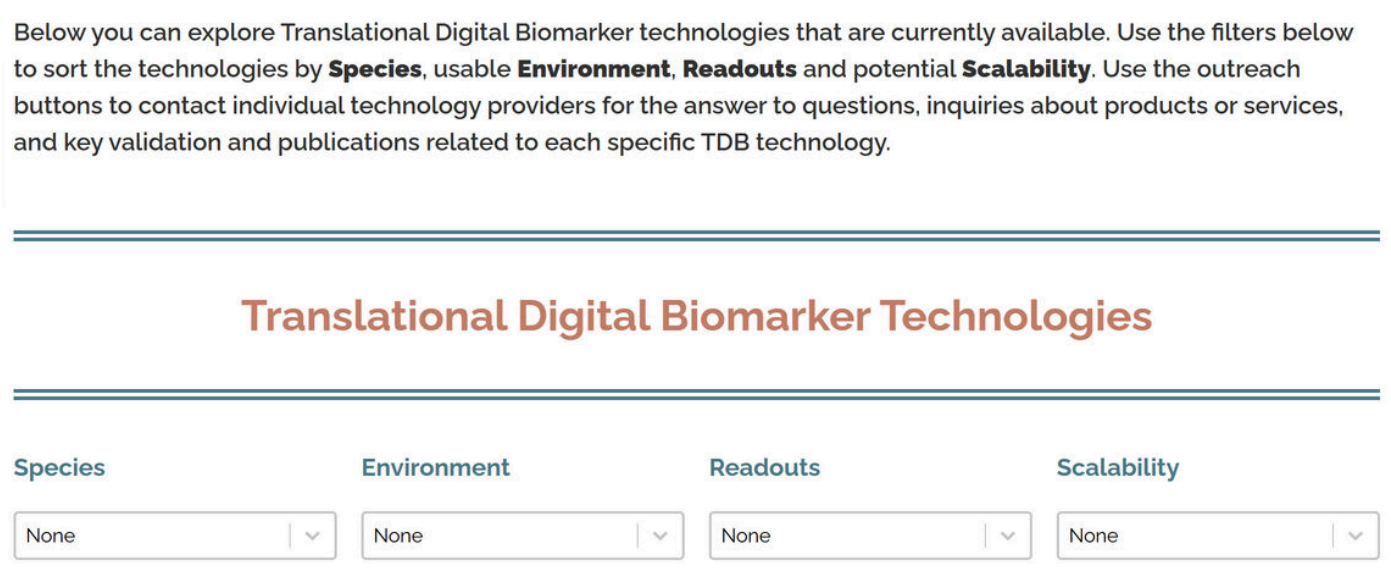
With the advent of 24/7 monitoring systems for animal behavior and physiology, it is now easier than ever to develop digital biomarkers that are translational. However, despite the enormous potential for this technology to advance better science, more is needed to be done to advance its implementation 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 2024 we:

- Finalized, submitted, and revised a publication titled "Validation framework for in vivo digital measures", which was formally accepted in January of 2025
- Began drafting a survey project focused on return on investment for TDB
- Expanded our TDB technology hub to include 6 commercial providers
- Organized 3 presentations to advance the use of these important technologies (3Rs Sharing, Measuring Behavior, independent presentations at others)



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



Advancing Critical 3Rs Techniques

Improving Non-Human Primate Welfare through Behavioral Management

Although non-human primates make up less than 1% of research animals, they play a critical role in biomedical research and are essential to focus on improved welfare and refinement needs. There have been a number of publications and resources related to implementation, yet there still remains a gap in uptake of key refinements and thus more work to be done on this topic.

There is no other US based, research primate focused group balanced across academic, pharma, and various roles in the research setting. This initiative, established in 2023, focuses on practical, actionable, and implementable ways to improve NHP welfare through behavioral management.

In 2024, the 3RsC NHP initiative expanded our efforts to focus on the development and writing of a review paper on refining NHP housing and human-animal interactions which will be submitted in the first half of 2025. This initiative is now composed of 20 individual members from 14 different institutions. NHP initiative members also presented on behalf of the 3RsC for the first time at AALAS 2024.

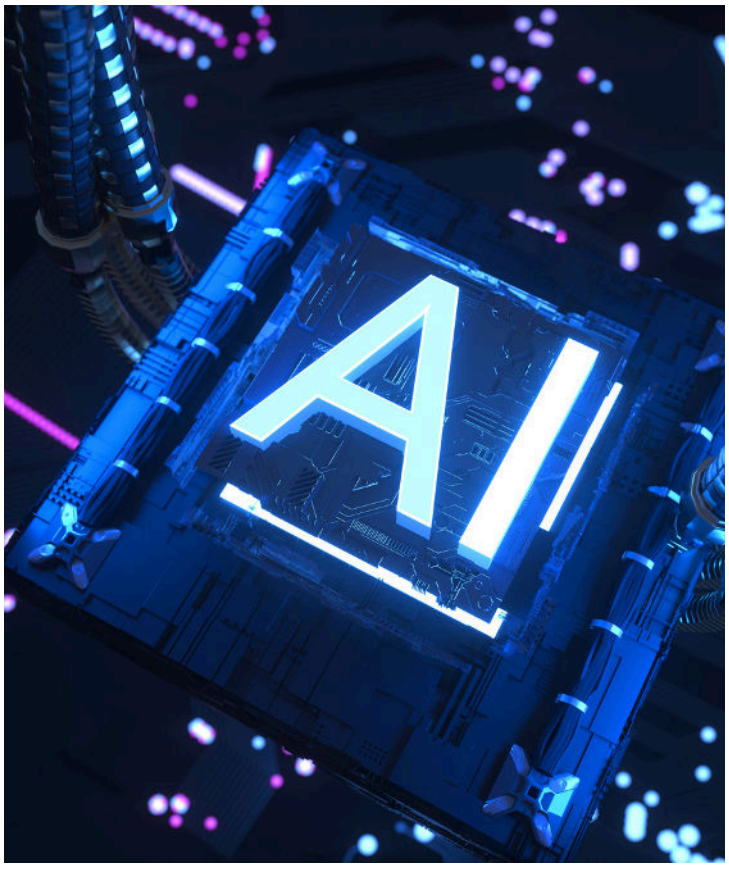
Advancing Critical 3Rs Techniques

Utilizing artificial intelligence to enhance risk assessment & safety

Artificial Intelligence technologies can increase the quality and amount of information gained from both human and animal studies and offer unique opportunities for scientific advancement. Artificial Intelligence represents an opportunity to complement and, in some cases, reduce reliance on animal models in biomedical research and preclinical drug discovery and development.

The 3RsC Artificial Intelligence Initiative is a collaboration between technology developers, end-users, regulators, academics, and other stakeholders in the AI space. It provides a venue for productive interaction between key stakeholders in the industry to advance implementation and qualification of artificial intelligence methods.

This initiative is co-led by Szczepan Baran (VeriSim Life) and Weida Tong (US-FDA) and currently includes 21 individuals from institutions such as AbbVie, Charles River Laboratories, US-EPA, HESI, Novartis, NIH/NIEHS, Pfizer, Novartis, and more.



This initiative was formally launched in November of 2023.

In 2024, we

- Finalized our group charter defining our core objectives & initial definitions
- Hosted an in-person meeting for members at the national Society for Toxicology (SOT) Meeting
- Fully drafted a review manuscript focused on the use of AI for safety & risk assessment

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 2024, we fostered awareness and collaboration with key stakeholders by:

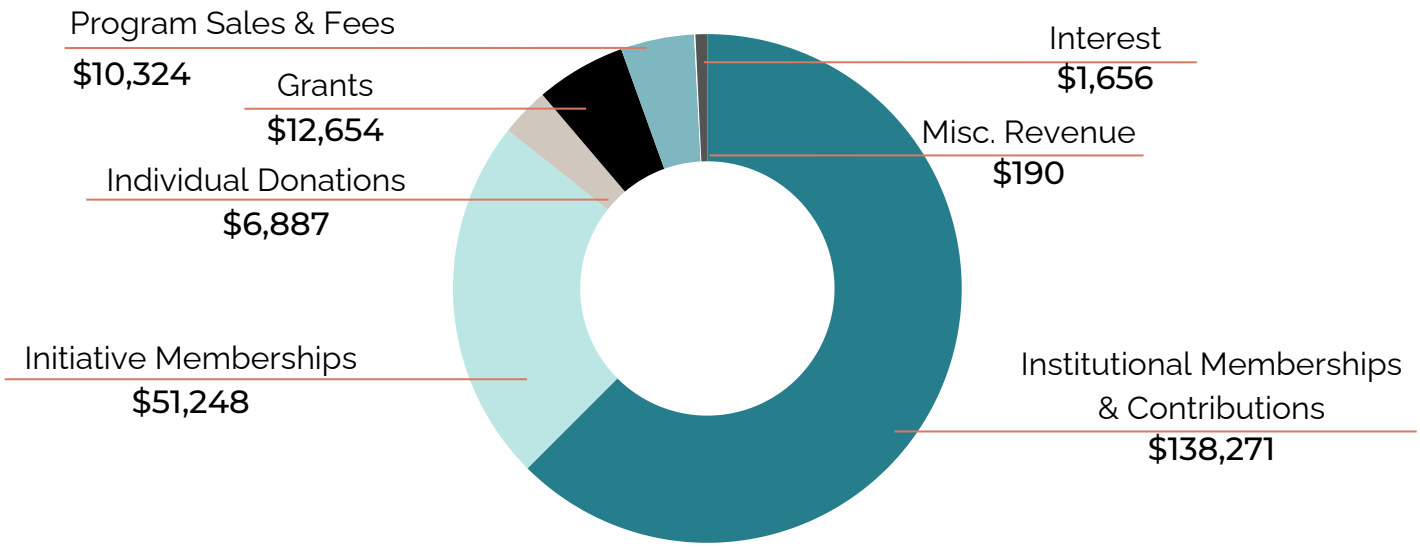
- Contributing over 20 presentations at 9 conferences or events
- Having AAALAC Membership & being active on the 3Rs SubCommittee
- Meeting and collaborating with over 10 critical stakeholders including: US-FDA-CDER, IQ-MPS, NC3Rs, NWABR, NJABR, NIH-OLAW, NTP, NICEATM, ICCVAM, SACATM, FNIH, SLC, C-PATH, HESI, etc.
- Publishing >60 newsletters and >130 social media posts
- Gaining 1120 new newsletter subscribers. Sign up for our newsletter here.

Financial Report

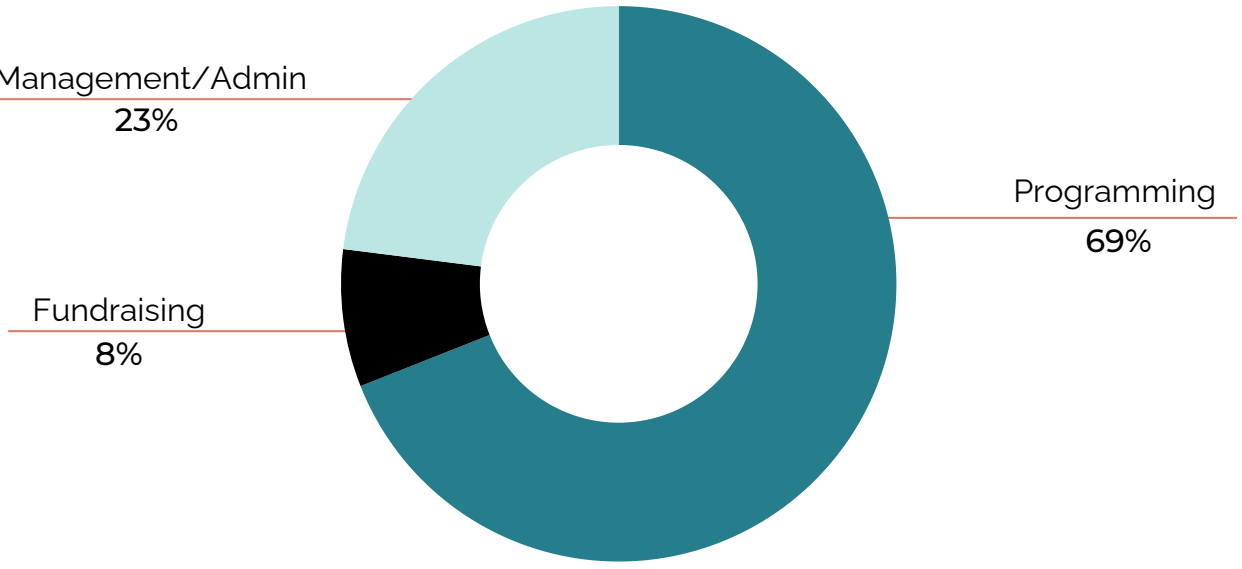
The 3Rs Collaborative's operating funds come from 5 main sources: institutional memberships/contributions, initiative memberships, individual donations, grants, and program sales & fees. Our expenses fall into 3 main expense categories: programming, fundraising, and overall administration & management. In 2024, our total revenue was $227,826, total expenses were $225,860, total assets was $193,666, total liability was $7332, and total equity was $86,334

In 2024, 69% 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.

142 Total Members/Donors

45 New Members/Donors

95% Initiative Member Retention Rate

96% Organizational Member Retention Rate

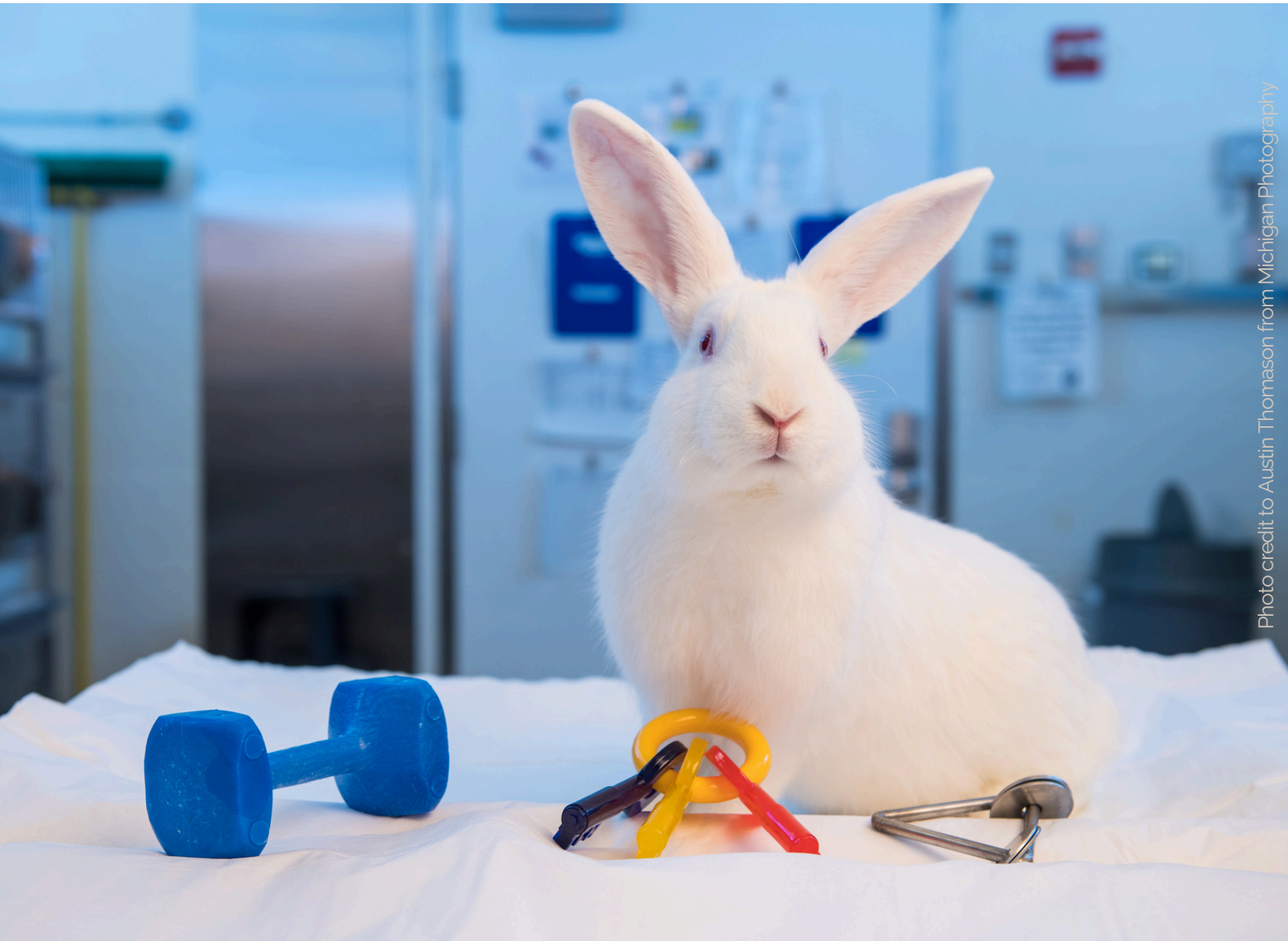


Photo credit to Austin Thomason from Michigan Photography

Impacts by The Numbers

Inputs: Activities & Resources Provided by the 3RsC

General 3Rs Training & Resources

- 70 general resources (6 new)

Symposia, Presentations, and Other Events

- Hosted 1 conference, 1 webinar, & 4 workshops
- Attended 9 conferences
- >20 presentations

Specific 3Rs Initiatives

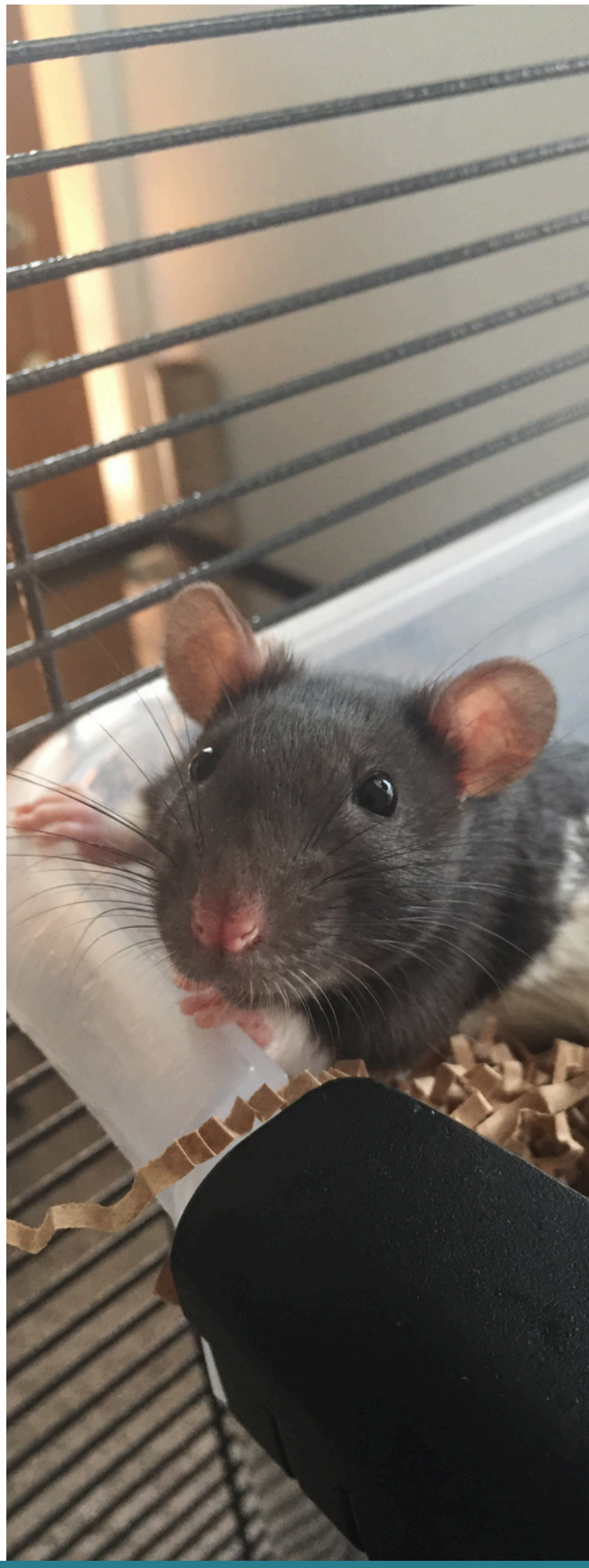
- 8 initiatives

Collaboration with Other Organizations and Individuals

- >75 collaborating organizations
- >150 dollaborating individuals

Information Resources

- 70 resources (6 new)
- 62 newsletters
- 2 public responses to AAALAC



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

- 6 new resources
- 2 new publications

Development of collaborative and mentoring networks.

- >75 collaborations as shown by exchange of information
- 2 mentorship programs
- 8 collaborative working groups

Dissemination activities

- >3600 newsletter subscribers (1120 new subscribers)
- Newsletter open rate 48% & click rate 9% (ranging from 2-40%)
- >87,000 website views from >44,000 visitors
- LinkedIn: 3,901 followers, 136 posts, >113,000 Impressions, 6% 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 organizations working with 3RsC

Uptake of key 3Rs techniques

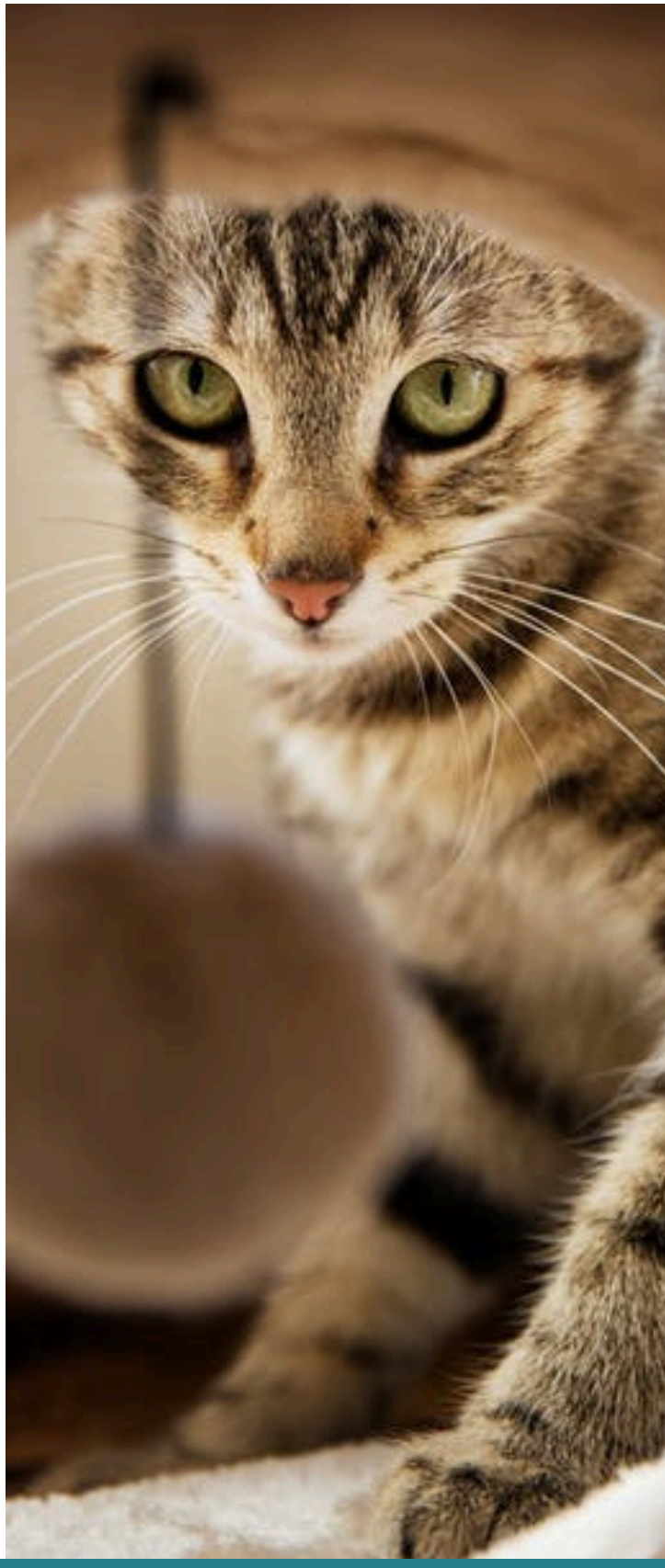
- >35 organizations adopting techniques promoted by 3RsC

3Rs and culture of care embedded in institutional culture

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

The 3RsC as a trusted source for 3Rs Information

- >10 organizations consulting with the 3RsC
- 10 invited staff presentations
- >87,000 website views from >22,000 visitors (>20% increase from 2023)
- 100 organizational 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 organizations members are 3Rs leaders and make our impacts in 2024 possible!

Platinum: $15,000+/$7,500+

charles river

GSK

MilliporeSigma

UNIVERSITY of WASHINGTON

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

ALTASCIENCES

AstraZeneca

Bristol Myers Squibb™

NOVARTIS

Takeda

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

abbvie

Biomere

RUTGERS

scientist.com

FDA

Princeton University

Thank You to Our Members!

Our organizational members are 3Rs leaders and make our impacts in 2024 possible!

BRONZE: $1,000/$500

AMGEN

Benaroya Research Institute

Bio-Serv
Advancing Science. Enriching Animals
ISO 9001:2015 Certified

Boehringer Ingelheim

Genentech
A Member of the Roche Group

INSTECH

Kent Scientific
CORPORATION

labcorp

LOMIR
BIOMEDICAL INC.

MARSHALL
BIORESOURCES

ReCode
THERAPEUTICS

sanofi

Stoelting
SINCE 1886

TransnetYX
Serving research. Saving time.

TURNER
SCIENTIFIC

uOttawa

THE UNIVERSITY OF CHICAGO

University of Colorado
Anschutz Medical Campus

VIRSCIO

OTHER INSTITUTIONAL MEMBERS: Elanco Animal Health

Thank You to Our Initiative Members!

Our initiative members provide essential monetary support and in-kind subject matter expertise to advance the 3Rs!

EHM Initiative Members: $1000+

Allentown – Improving Life – it's in our DNA.®
charles river
IDEXX BioAnalytics
TECNIPLAST – innovation through passion℠
VRL – Animal Health Diagnostics

TDB Initiative Members: $1000+

abbvie
Allentown – Improving Life – it's in our DNA.®
Animal Care | Systems
Calico
charles river
COLUMBUS INSTRUMENTS
evotec
Noldus – Information Technology
PHENOSYS – Technology for Behaviour Analysis
SABLE SYSTEMS INTERNATIONAL
SwiftSCIENCE
VERISIMLife
uid IDENTIFICATION SOLUTIONS

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

Thank You to Our Members!

MPS Initiative Members

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
Szczepan Baran
Taylor Bennet
Susan Bolin
Angela Brice
Linda Bryan
Cindy Buckmaster
Laura Conour
Deborah Curry
Jim Curry
Noel Dybdal
Maria Ejlertsen
Theresa Fuaghnan
Derek Fong
Christopher Gamble
Alejandra Garcia Gasca
Matthew Grant
Robert Gump
Alan Hoberman
Megan LaFollette
Meaghan Loy
Kerith Luchins
Christopher Manuel
Lauren Martin
Elizabeth Nunamaker
Jerry Poling
Clive Roper
David Serra
Barbara Stone
Sally Thompson-Iritani
Melissa Truelove
Cheryl Woods