



### **ORIP Established December 2011**



## ORIP mission: *Infrastructure for Innovation*

- Research infrastructure
- Research resource programs

#### ORIP's Strategic Plan

- Emphasis on trans-NIH activities
- Emphasis on precision and reproducibility
- Emphasis on improving shared resources



#### **ORIP FY 2018 Portfolio**

#### **Division of Comparative Medicine (DCM)**

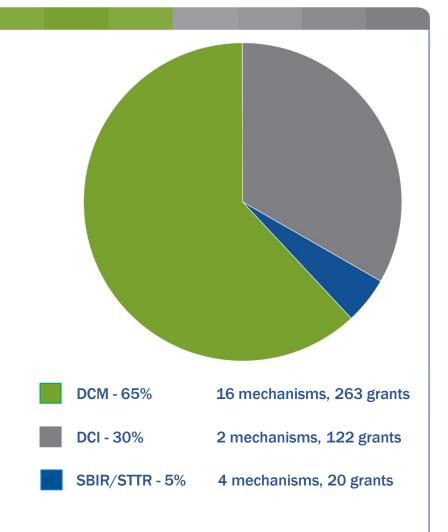
- Nonhuman Primate Resources
- Vertebrate & Invertebrate Animal Resources
- Genetic, Biological, & Other Resources
- Human Tissue and Organ Resource for Research
- Career Development

#### **Division of Construction and Instruments (DCI)**

- Extramural Construction
- Research and Animal Facilities Improvement
- Shared and High-End Instrumentation Grants

#### **Small Business Programs**

Related Small Business (SBIR/STTR) Grants





## **Pathway to the Plan**

- Planning Process 2014-2016
- Focus groups with NIH staff
- Extramural Program Management Committee
- Public requests for information (RFIs)
- External stakeholder conferences
  - Two workshops
  - Two Council members as liaison





#### **ORIP Thematic Areas**

- High Priority Areas
- Theme 1 Developing models of human diseases
- Theme 2 Accelerating discovery with state-of-the-art instrumentation
- Theme 3 Training and diversifying the biomedical workforce



minds. ORIP provides support for veterinary scientists to join

the biomedical research enterprise and supports science education for pre-kindergarten through grade 12 (P-12)

students, with an emphasis on reaching students from

underserved communities.

6 Strategic Plan: Infrastructure for Innovation

these models. Examples of supported animal models

primates of different sizes and origins; other mammalian

species, such as pigs; aquatic models, such as fish, frogs,

and salamanders; and invertebrates, such as fruit flies, nematodes, and protozoa. ORIP maintains these resources

at specific centers that make these critical disease models

### **Veterinary Scientists as Translational Researchers**

## Training and Diversifying the Biomedical Workforce

- Train veterinary scientists as translational researchers

- Breadth of training across many species is unique among biomedical researchers
  - Deep understanding of species differences
  - Comparative understanding of disease models
  - Contributions to model identification and improvement
  - Distinct perspectives and expertise for translational research
- ORIP veterinary scientist training spans many NIH topics and research interests





## **ORIP's Career Development Programs**

- T35-Institutional predoctoral summer research program for veterinary students
- T32-Institutional postdoctoral training to prepare graduate veterinarians for biomedical research careers
- F30-Fellowship for dual-doctoral degree training (veterinary students)
- F31–Fellowship for veterinarians working on PhD (graduate veterinarians)
- K01-Mentored career development for veterinarians to become independent biomedical investigators
- R03-Limited competition for ORIP K01 awardees (veterinarians)
- LRP-Repay up to \$35,000 annually of a researcher's educational debt





## **K01 Career Development Award**

- Special Emphasis Research Career Award (SERCA) K01
  - A five-year mentored career development award
  - 70 awards since 2003
    - 74% had previous T32 or T35 support
    - 77% of these T-grants were from from ORIP
  - Longer term outcomes
    - 39 awards were made between 2003-2011
    - 90% still in research positions (academia, pharma, etc.)
    - 87% have published in the last 4 years





## **Future Training Needs**

#### ORIP convened expert panel on training-Summer 2018

- Identify challenges involved for veterinary scientists to acquire the biomedical research skills they need
- Establish the skills currently needed to integrate biomedical findings across multiple disciplines/model species
- Collaborate with NIH ICs on programs that develop specialized expertise (e.g., pathology, emerging infectious diseases, etc.)
- Explore ways to facilitate collaborations between physicians and veterinary scientists
- Plan future workshop to identify opportunities and approaches





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## **ORIP's Shared Instrumentation Programs**

# Accelerating Research Discoveries by Providing Access to State-of-the Art Instrumentation

- Optimize the instrumentation program though forward-looking program management
- Continue to accelerate research discoveries by providing access to state-of-the-art instruments

#### State-of-the-art research shared instruments

 Support for purchase of state-of-the-art, expensive, commercially available instruments used on a shared basis to enhance research of NIH-funded investigators

#### **Instrument Programs** (three flavors)

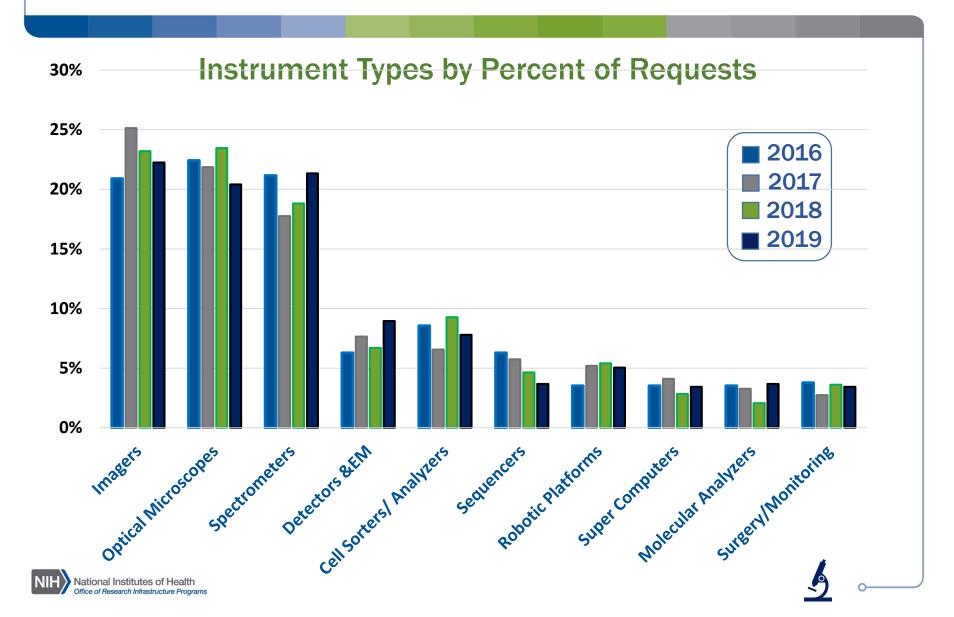
- Shared Instrumentation Grant (SIG) Program (1980)
- High-End Instrumentation (HEI) Program (2001)
- Shared Instrumentation for Animal Research (SIFAR) Program (2018)



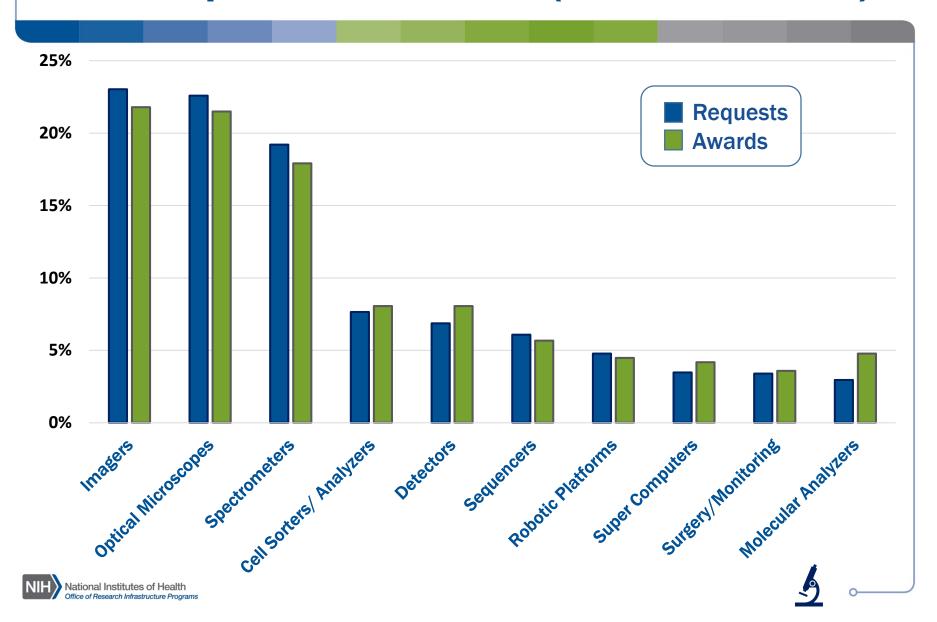




## **Shared Instruments: Technology Requests**



## SIG Requests and Awards (FYs 2016–2018)

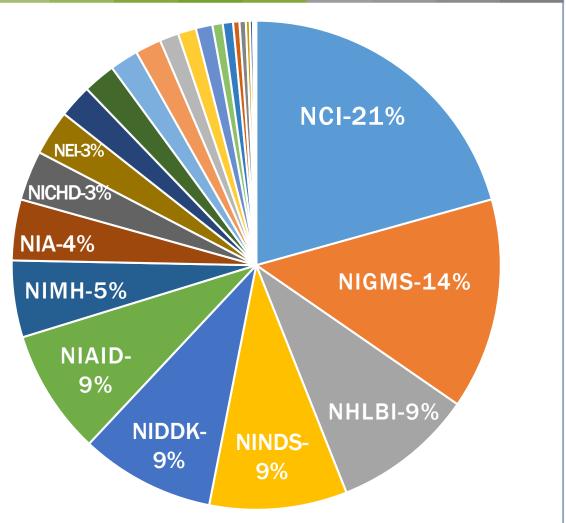


## **Shared Instruments: IC Representation on Awards**

**SIG** supports researchers funded by these **NIH** ICOs

Charts displays % IC representation on funded SIG applications

- ~%2- NIDA, NIBIB, NIAMS, NIEHS
- ~%1- NIDCD, NIDCR, NIAAA
- <%1- NCCIH, NHGRI, NINR, NCATS, OD, NLM, NIMHD



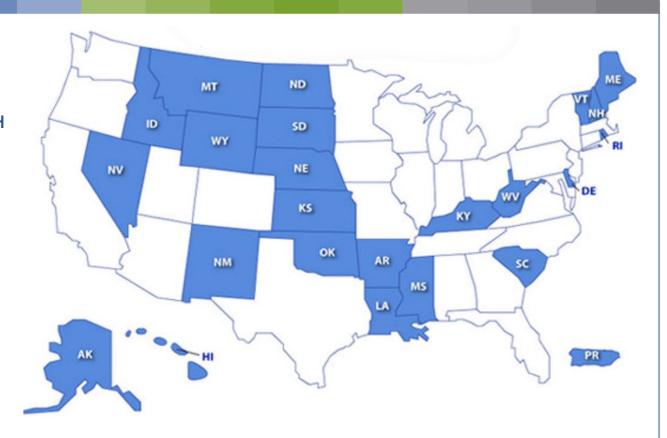




## **IDeA – Institutional Development Awards**

#### **IDeA-eligible States:**

Those with historically low NIH grant funding success (established in 1993)



23 States + Puerto Rico are eligible for IDeA funding



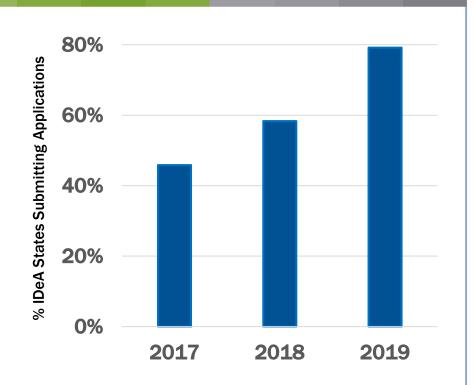




## **NIGMS-ORIP Collaboration**

## **Working to increase IDeA participation in the shared instrumentation program**

- NIGMS & ORIP staff exchange information and discuss applications
- ORIP staff participate in IDeA state meetings
- NIGMS provided funding for meritorious SIG applications from IDeA states
- Language for funding announcement modified to specifically encourage IDeA applications



• Participation among IDeA-eligible states has increased from 46% to 79%. (100% of non-IDeA states apply every year)







## **Shared Instrumentation Programs Summary**

- Program important to NIH-funded investigators
- Nimble programmatic approach adapts to rapidly evolving needs
  - One-year awards with annual funding announcements
  - Funding adjusts to application pressure
- Serves all NIH ICs and can adjust to address unmet needs





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ORIP supports an intellectual infrastructure for biomedical infrastructure required to maintain, distribute, and utilize these models. Examples of supported animal models primates of different sizes and origins; other mammalian species, such as pigs; aquatic models, such as fish, frogs, and salamanders; and invertebrates, such as fruit flies nematodes, and protozoa, ORIP maintains these resource at specific centers that make these critical disease models

would not be available to many researchers

ORIP also supports human infrastructure for biomedical research by investing in the next generation of creative minds. ORIP provides support for veterinary scientists to join the biomedical research enterprise and supports science education for pre-kindergarten through grade 12 (P-12) students, with an emphasis on reaching students from underserved communities.



### **ORIP's Human Disease Model Resources**

## **Developing Models of Human Diseases**

- Expand and ensure access to animal models
- Continue to develop and enhance human disease models and research-related resource program to advance medical research

#### **Invertebrate models**

- Tetrahymena
- Drosophila
- Caenorhabditis
- Aplysia

#### **Vertebrate models**

- Aquatic Ambystoma, Xenopus, Zebrafish
- NHP Baboon, Macaque, Marmosets
- Rodents Mice, Rats
- Swine

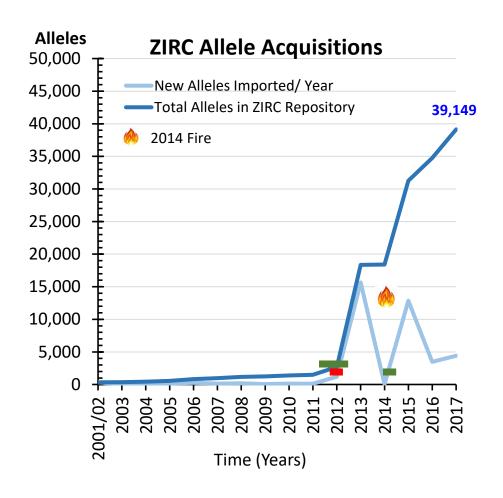
#### Genetic, biological, and information resources

- Genetic analysis *Drosophila*, NHP, Sea Urchin
- Biological materials Human Tissues, NHP, Vipers
- Information resources BioGRID, MMRRC



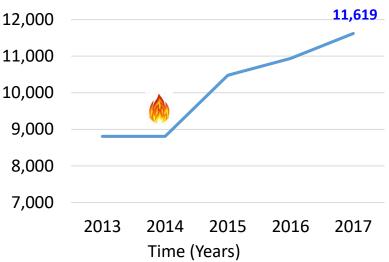


## **ZIRC Acquisitions 2001–2017**



## Large-scale Mutagenesis Screen Imports Zebrafish Mutation Project - Sanger Burgess/Lin - Retroviral Insertion Mutants

#### **Total number of lines at ZIRC**



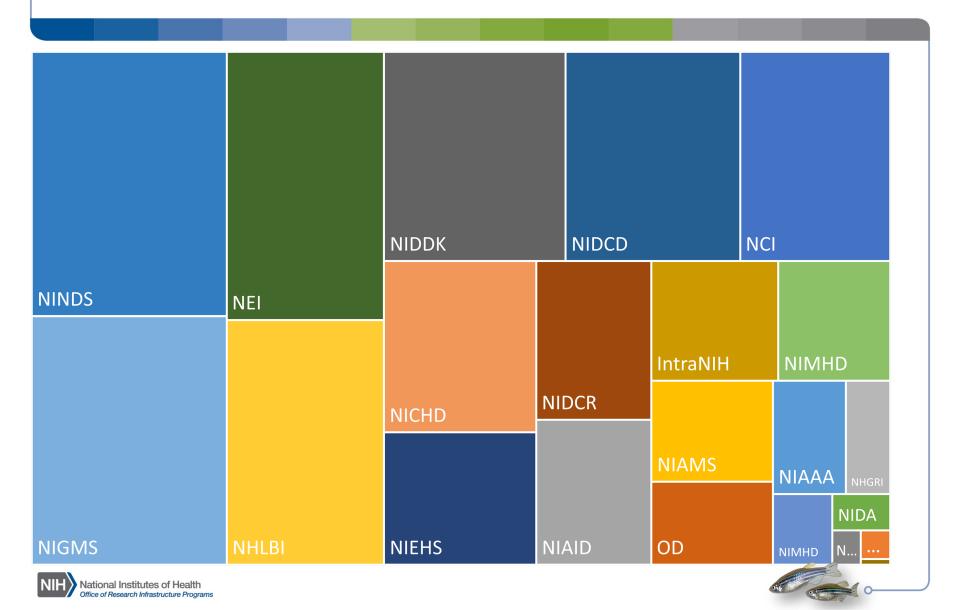




## ZIRC Distribution 2013–2017



## **Relative Distribution to NIH-Supported Researchers**



## **Significant Past Investment and Existing Activities**

#### Cryopreservation

- Germplasm resources for preservation of zebrafish reproducibility, quality control, and standardization
  - ✓ Significant improvement of cryopreservation efficiency
- Workshop on Cryopreservation of Aquatic Biomedical Models (2017)
- New funding opportunity Development of novel and emerging technologies for cryogenic or long-term preservation
- Research on embryo cryopreservation (freeze-thaw cycle)
  - ✓ Laser warming using gold nanoparticles
- Support to the USDA National Animal Germplasm Program for safe off-site storage of ZIRC's cryopreserved materials





## **Final Thoughts on Mid-Point Update**

- Acknowledgements
- Long-lasting benefits in support of NIH's mission
  - Animal/Disease Models
  - Animal Care and Use programs promoted and executed at ORIP-supported resource centers
  - Research Infrastructure such as construction
  - Shared Instrumentation
- ORIP resources not just those highlighted today have significant value to programs funded across NIH
- ORIP's next SP will be presented to Council for input during development.



## **Questions?**







### **Research Topics - Web of Science Classification**

