

**Opportunity Title:** FDA Fellowship in Novel Computer Vision Systems for Behavior and Health Detection in Animal-based Studies  
**Opportunity Reference Code:** FDA-CBER-2022-27

**Organization** U.S. Food and Drug Administration (FDA)

**Reference Code** FDA-CBER-2022-27

**How to Apply** *Connect with ORISE...on the GO!* Download the new ORISE GO mobile app in the [Apple App Store](#) or [Google Play Store](#) to help you stay engaged, connected, and informed during your ORISE experience and beyond!

A complete application consists of:

- An application
- Transcripts – [Click here for detailed information about acceptable transcripts](#)
- A current resume/CV, including academic history, employment history, relevant experiences, and publication list
- One educational or professional recommendation

All documents must be in English or include an official English translation.

If you have questions, send an email to [ORISE.FDA.CBER@orau.org](mailto:ORISE.FDA.CBER@orau.org). Please include the reference code for this opportunity in your email.

**Application Deadline** 12/31/2022 3:00:00 PM Eastern Time Zone

**Description** \*Application will be reviewed on a rolling-basis.

A research opportunity is available in the Office of OM/ Division of Veterinary Services, Center for Biologics Evaluation and Research (CBER) at the Food and Drug Administration (FDA), (two site locations) Silver Spring, MD and Bethesda, MD.

This fellowship will focus on advancing the progress of high impact projects for automated tracking and behavior detection of research animals. The fellowship will offer an exciting opportunity for the fellow to gain in depth knowledge of the popular field of computer vision and deep learning.

The training project will involve tailoring the latest algorithms developed by leaders in the field for object detection and pose estimation to track and potentially uniquely identify (in case of multiple animals per cage) multiple animals. Also adapting behavior detection methods to profile general behaviors (e.g., walking, eating, climbing) as well as behaviors of special interest to different investigators (e.g., breathing rate detection for COVID-19 hamsters, fine-grained mouse scratching for itch and pain studies, seizure detection, etc). The fellow will gain and solidify skills in Python and deep learning packages such as PyTorch. The fellow will acquire experience in cloud computing to streamline processing for large and/or long-term animal studies.

The project also offers an opportunity to gain familiarity with 3D CAD design along with fabrication and prototyping which might be needed for novel system design for specialized animal studies. The fellow will be given the opportunity to summarize research findings at conference, and participate in journal publications for which the ORISE fellow will get authorship recognition. Some projects target quantification and evaluation



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of the activity of mice and hamsters in cages housed in animal facilities for research purposes. Such systems would allow the behavioral effects of experimental treatments or genetic manipulations to be easily demonstrated and analyzed by investigators at the FDA White Oak Animal Research Program. The effects of genetic manipulations and novel treatments on murine behavior are largely hidden from animal users because assessment is specialized and labor intensive and typically needs to take place after the animal room lights go out. At the present time, no scalable systems are commercially available to accurately assess rodent activity and well-being while animals are on research studies within their primary enclosures. The systems in development open up the potential for large-scale wide-range use of automated video monitoring in animal facilities. Interested users of said systems include investigators working with mice experiencing slowly degenerative neurological disease as well as COVID-19 related animal studies.

Several video-monitoring systems, utilizing depth cameras and conventional video, have been designed and built in collaboration with NIH researchers. The optimized mechanical design of the systems allows high-quality video acquisition for rodent cages housed within ventilated racks. The systems low cost and suitability for use in existing animal facilities without modification to animal husbandry procedures or housing setup, renders it highly scalable and easy to use in FDA's research environment, including specialized infection-containment caging. The ORISE fellow, with support from other engineers from NIH National Institute of Biomedical Imaging and Bioengineering, will work on several aspects of the system development and video processing and analysis tools.

**Anticipated Appointment Start Date: September 2022.** Start date is flexible and will depend on a variety of factors.

This program, administered by ORAU through its contract with the U.S. Department of Energy to manage the Oak Ridge Institute for Science and Education, was established through an interagency agreement between DOE and FDA. The initial appointment is for one year, but may be renewed upon recommendation of FDA contingent on the availability of funds. The participant will receive a monthly stipend commensurate with educational level and experience. Proof of health insurance is required for participation in this program. The appointment is full-time at FDA in the Silver Spring, Maryland, area. Participants do not become employees of FDA, DOE or the program administrator, and there are no employment-related benefits.

Completion of a successful background investigation by the Office of Personnel Management is required for an applicant to be on-boarded at FDA. OPM can complete a background investigation only for individuals, including non-US Citizens, who have resided in the US for a total of three of the past five years.

FDA requires ORISE participants to read and sign their FDA Education and Training Agreement within 30 days of his/her start date, setting forth the conditions and expectations for his/her educational appointment at the agency. This agreement covers such topics as the following:

- Non-employee nature of the ORISE appointment;
- Prohibition on ORISE Fellows performing inherently governmental functions;
- Obligation of ORISE Fellows to convey all necessary rights to the FDA regarding intellectual

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property conceived or first reduced to practice during their fellowship;




- The fact that research materials and laboratory notebooks are the property of the FDA;
- ORISE fellow's obligation to protect and not to further disclose or use non-public information.

**Qualifications** The qualified candidate should be currently pursuing or have received a bachelor's degree in one of the relevant fields (e.g. Bioengineering, Biomedical Engineering, Electrical Engineering, Computer Sciences, Computer Engineering). Degree must have been received within the past five years of the desired starting date.

Developing the automated monitoring systems is a multi-faceted effort requiring knowledge in a variety of specialties. The projects can greatly benefit from the contribution of an ORISE fellow with interest and/or expertise in the following:

- Programming languages/tools: Python, C/C++
- Deep learning tools: PyTorch
- Image and video processing algorithm development, testing, and validation
- Three dimensional computer aided design (3D CAD).
- Mechanical design, fabrication, and assembly.
- Animal experiments setup and validation

**Eligibility Requirements**

- **Degree:** Bachelor's Degree received within the last 60 months or currently pursuing.
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** ([17](#) )
  - **Engineering** ([27](#) )
  - **Life Health and Medical Sciences** ([48](#) )

**Affirmation** Have you lived in the United States for at least 36 out of the past 60 months? (36 months do not have to be consecutive.)