UltraEx - Ultrasound Monitoring for Ultra-Refined Animal Experiments

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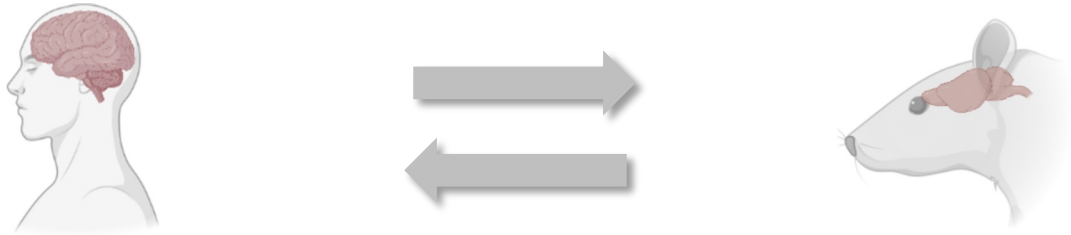
Holland High Tech

Global Challenges, Smart Solutions

Needs and Ethics for Animal Research

Why: Incredibly important to obtain knowledge for human <u>health</u>



Society & Government:

Animals experience distress in experiments and cannot give informed consent.

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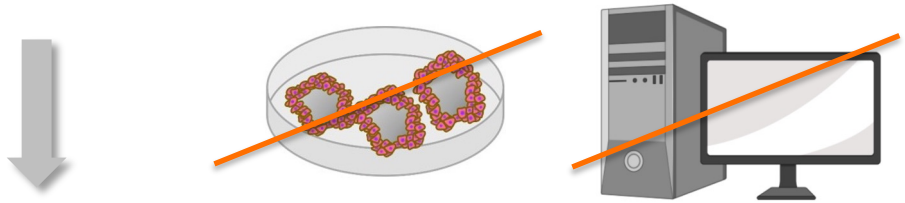

Ethical dilemma:

No viable alternatives exist to study the link between brain function and behaviour

Collaboration High-Tech Companies and Academia

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Real-Time Processing Pipeline

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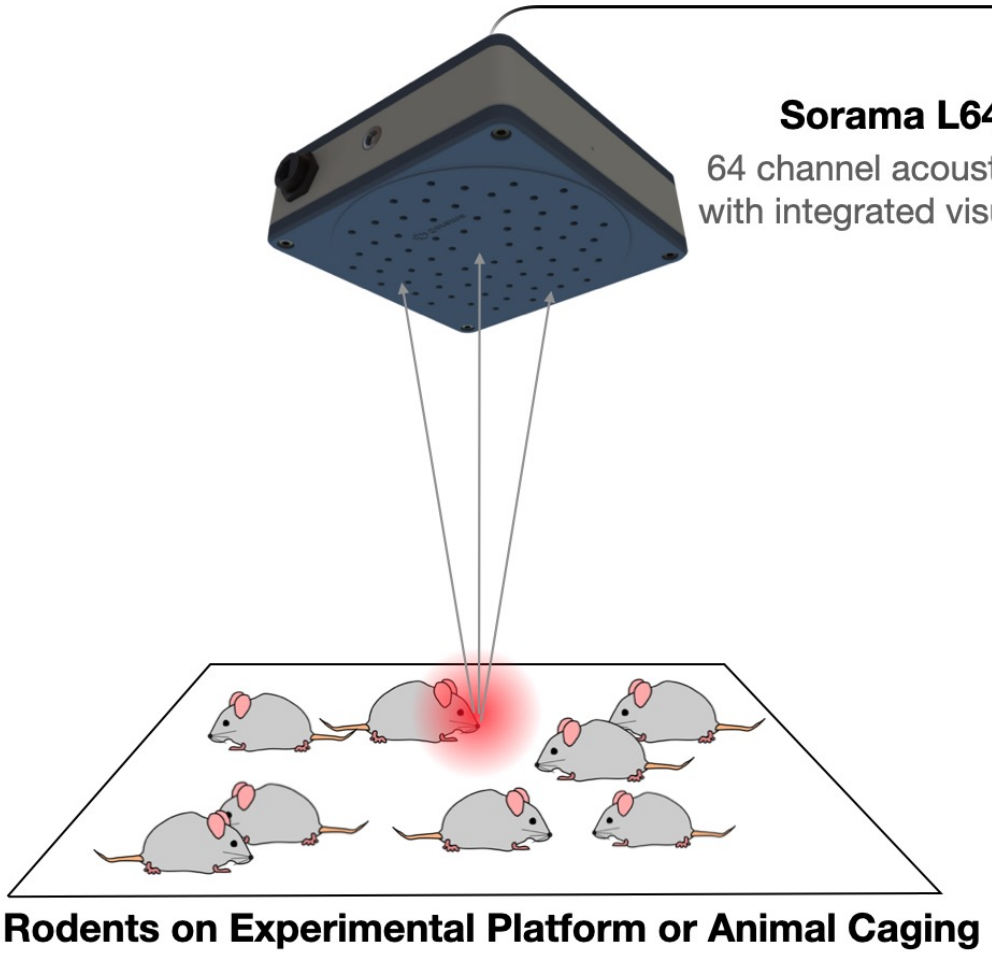

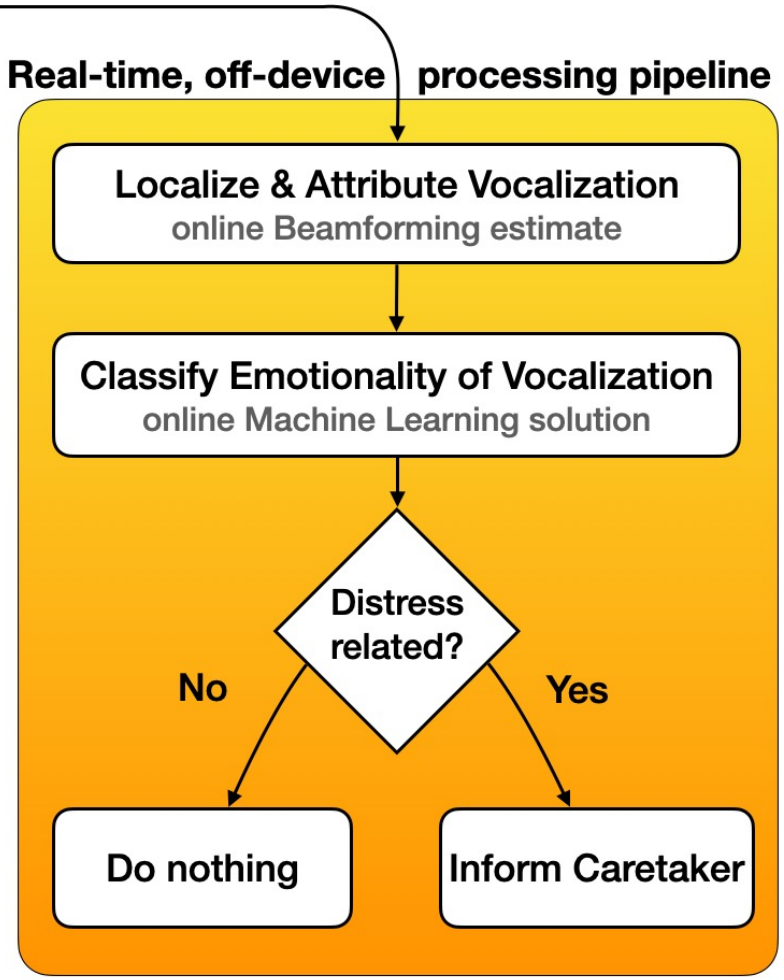

Real-Time Processing Pipeline – Component View

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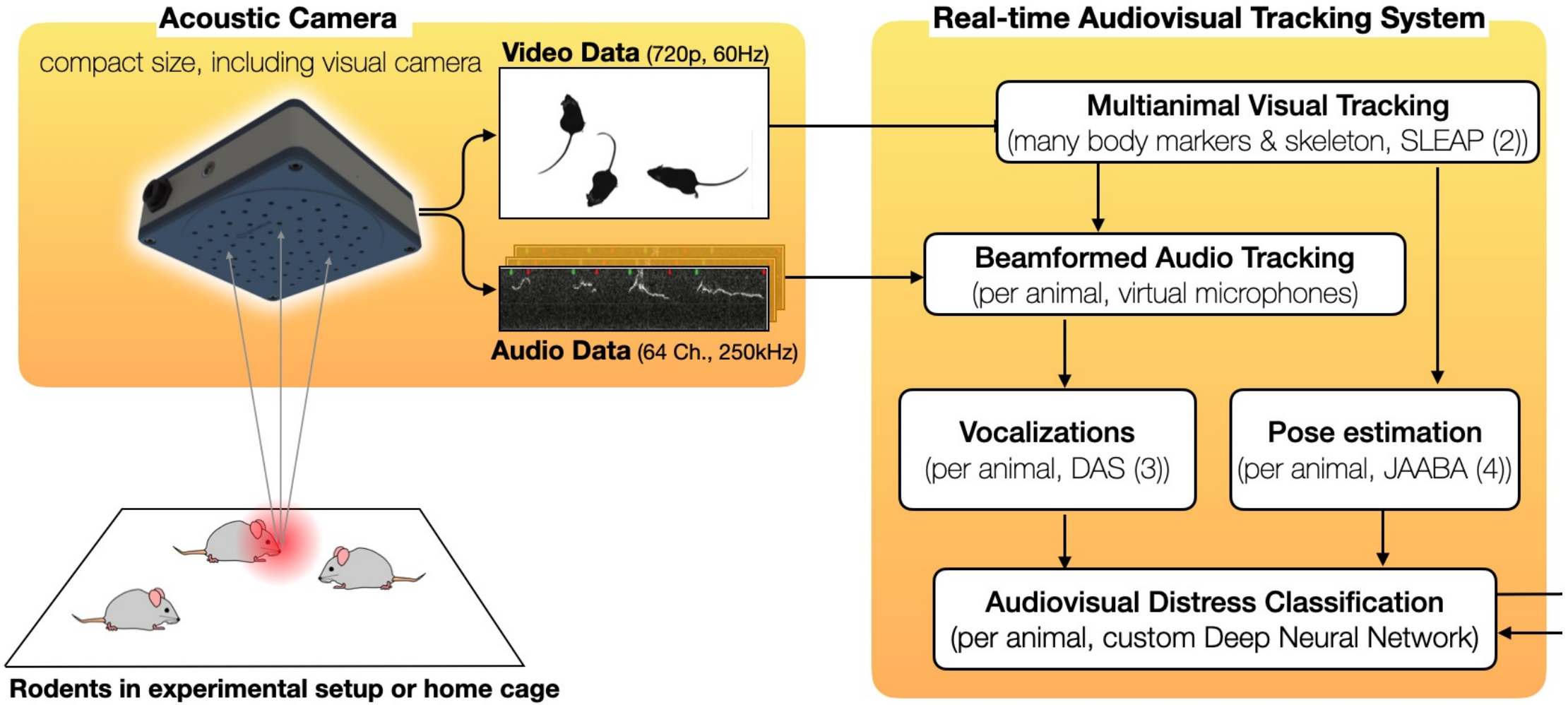

Automatic Tracking of Two Mice During Interaction

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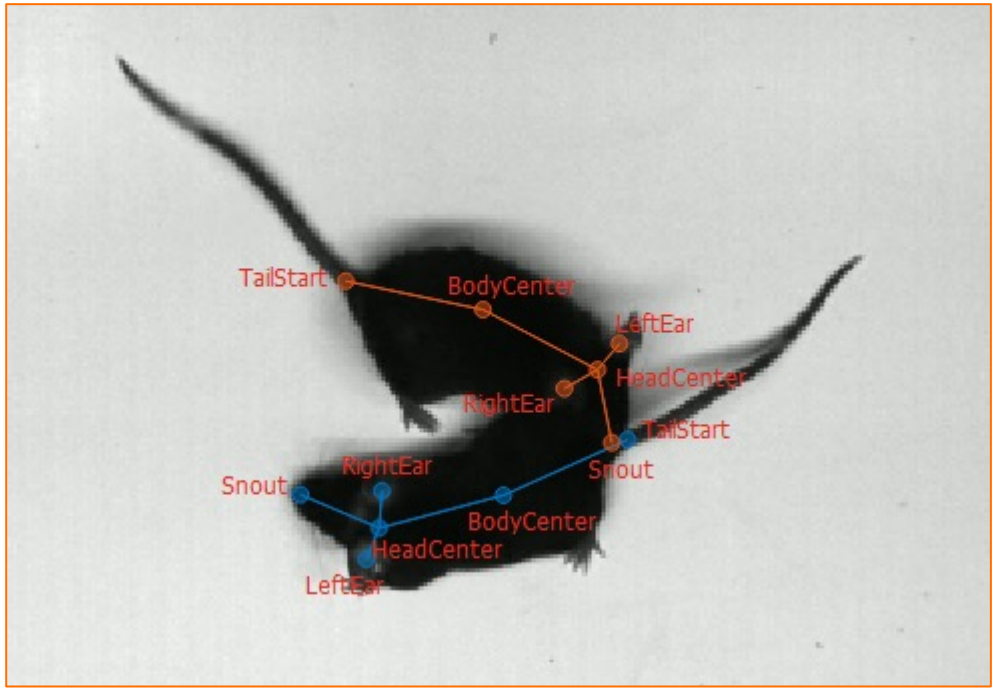
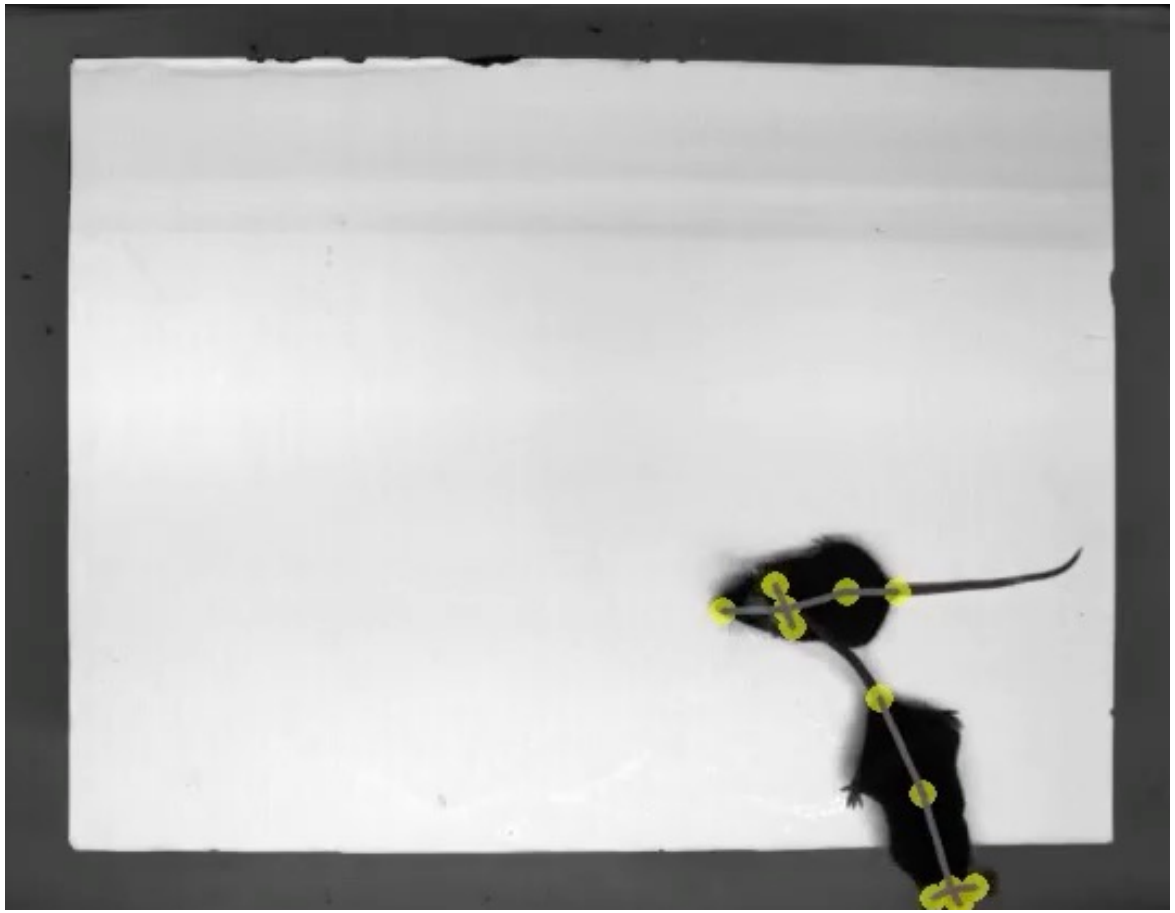
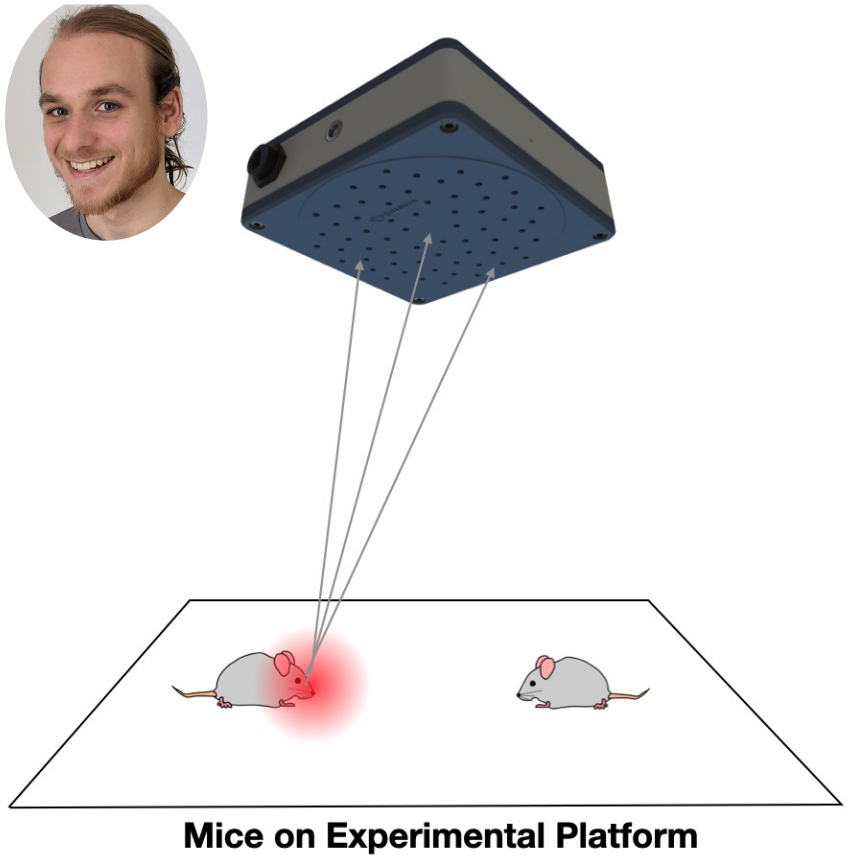
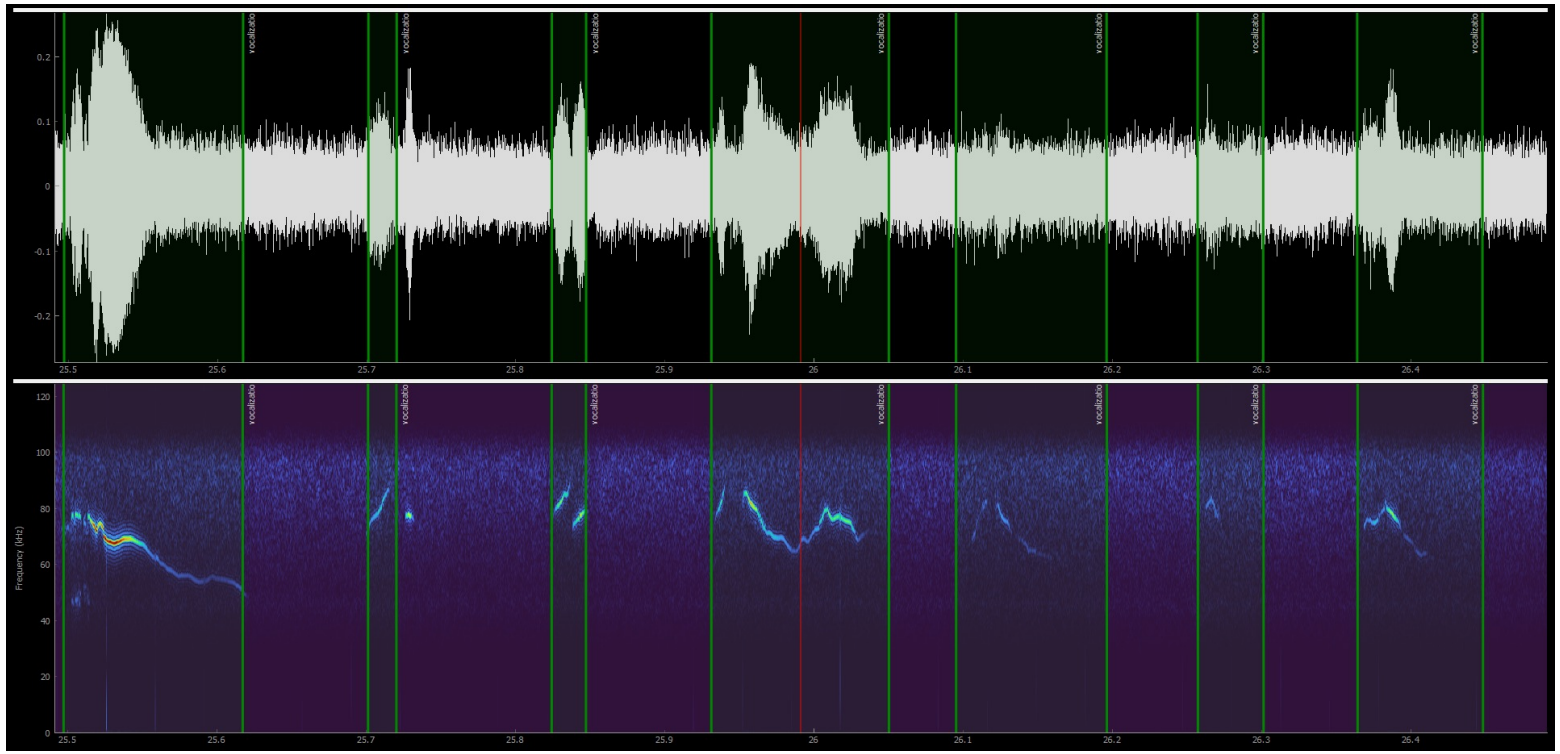




Integrating SLEAP (Peireira et al, Nature Methods, 2022)

Beamformed Audiostreams for Each Animal





Integrating Cam64 Beamforming (Sorama, and Stahl & Englitz, Nature Biomedical Engineering, under review)

Vocalization Detection from Multiple Mice

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Reference Audio Stream with Both Mice

Mouse 2

Mouse 1

Integrating DAS (Steinfarth et al. eLife, 2021)

Distress-Related Training Data Set – in Progress

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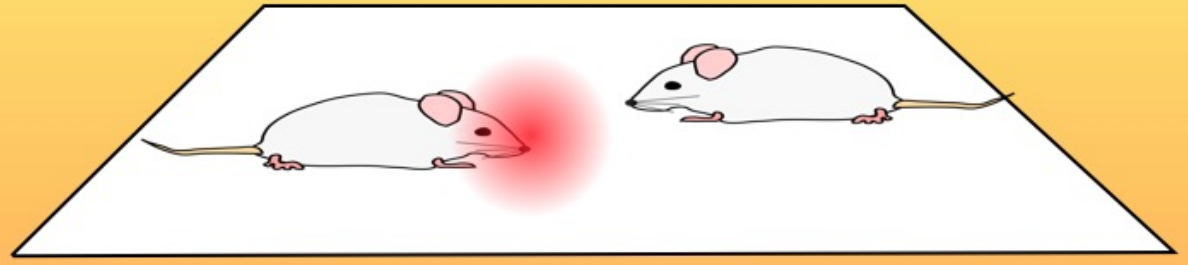
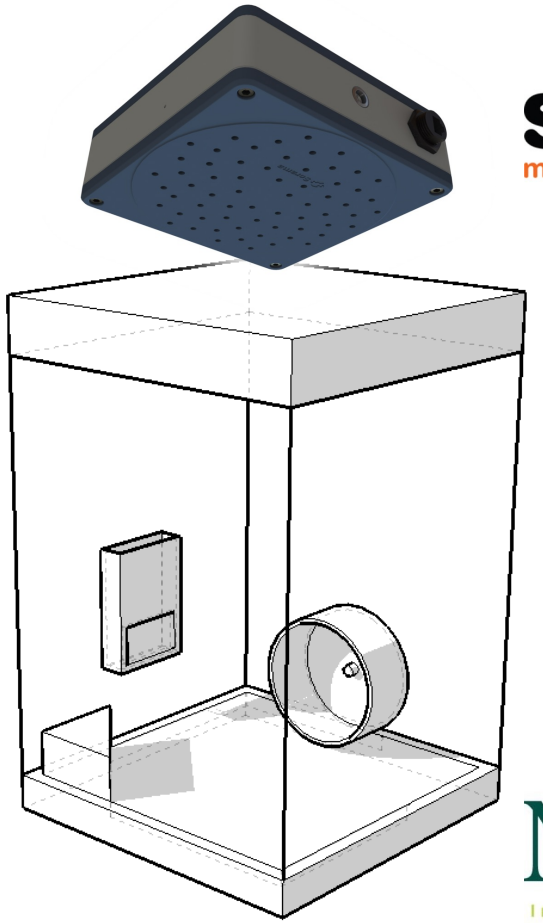
Training Dataset for Distress Classification

Rat vocalization in a resident/intruder paradigm



Conditions: intruder is a cage mate or unknown conspecific



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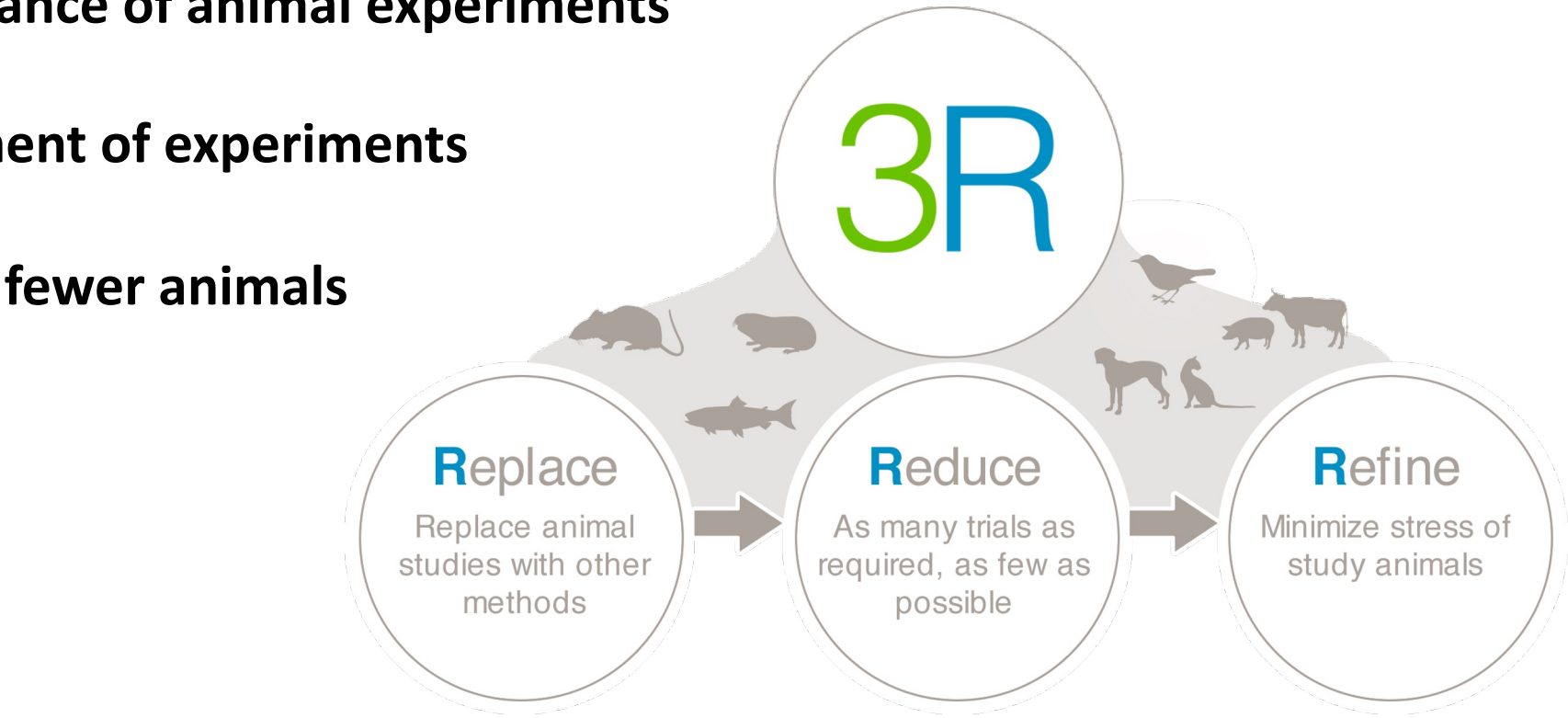
Roadmap for Project Completion

Impact

- **Increased public acceptance of animal experiments**
- **Contribution to refinement of experiments**
- **More precise data with fewer animals**



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