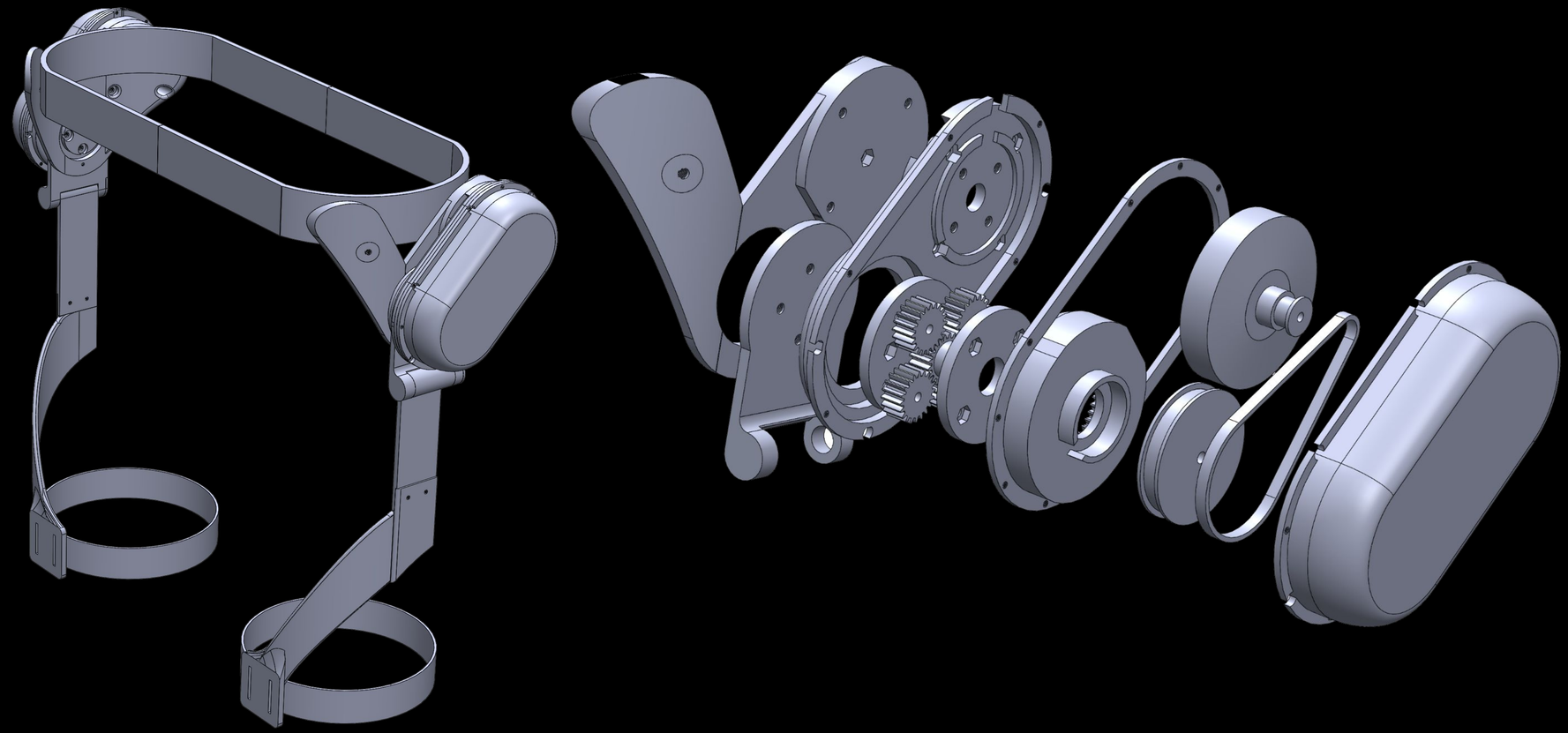
ARCS

AUTONOMY RESEARCH CENTER FOR **STEAHM**

Assistive
Robotic
Exo
Skeleton



Research Objective

Through our partnerships, we are developing robotic exoskeletons to help decrease human exhaustion levels in high endurance aerobic activities without compromising on body flexibility.

Research Team

Project Director: Jared Carrillo

Project Coordinator: Keiana Samoy

Research Associates: Oscar Hernandez, Caleb Ness, Ethan Morchy, Brandon Melee

Principal Investigator: Dr. Thomas Chan

CSUN

ARCS Autonomy Research Center for STEAHM

PAR-D

NIH National Institutes of Health

Research Methods

GAIT Optimization

Through virtual simulations and physical sensor measurements we aim to develop our GAIT algorithm in order to increase human-machine symbiosis.

Pilot Study

We will collect data through in person trials that will consist of monitoring exhaustion levels through VO_2 levels when running on a treadmill. Information collected will provide quantitative data on the support provided by the ARES I.

Research Approach

Physics

ARES assists by applying force to the users hamstring and calf muscles. Applying force in these areas decreases energy usage in swinging leg and kicking off the floor while in motion.

Mechanical Design

In order to increase torque we have implemented a planetary gearbox and a gear belt system in order to quickly change gear ratios if needed.

Electronics

Brushless motors are controlled with encoders in order to know it’s accurate rotational position. A small onboard computer is used to manage the IMU sensors and power delivery.