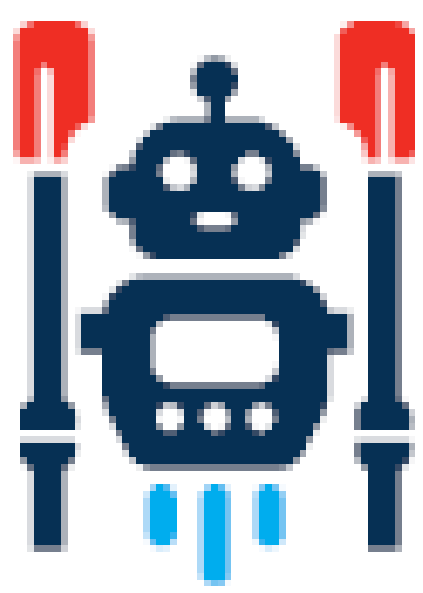




RowBot

Engineering Project by Max Pianta



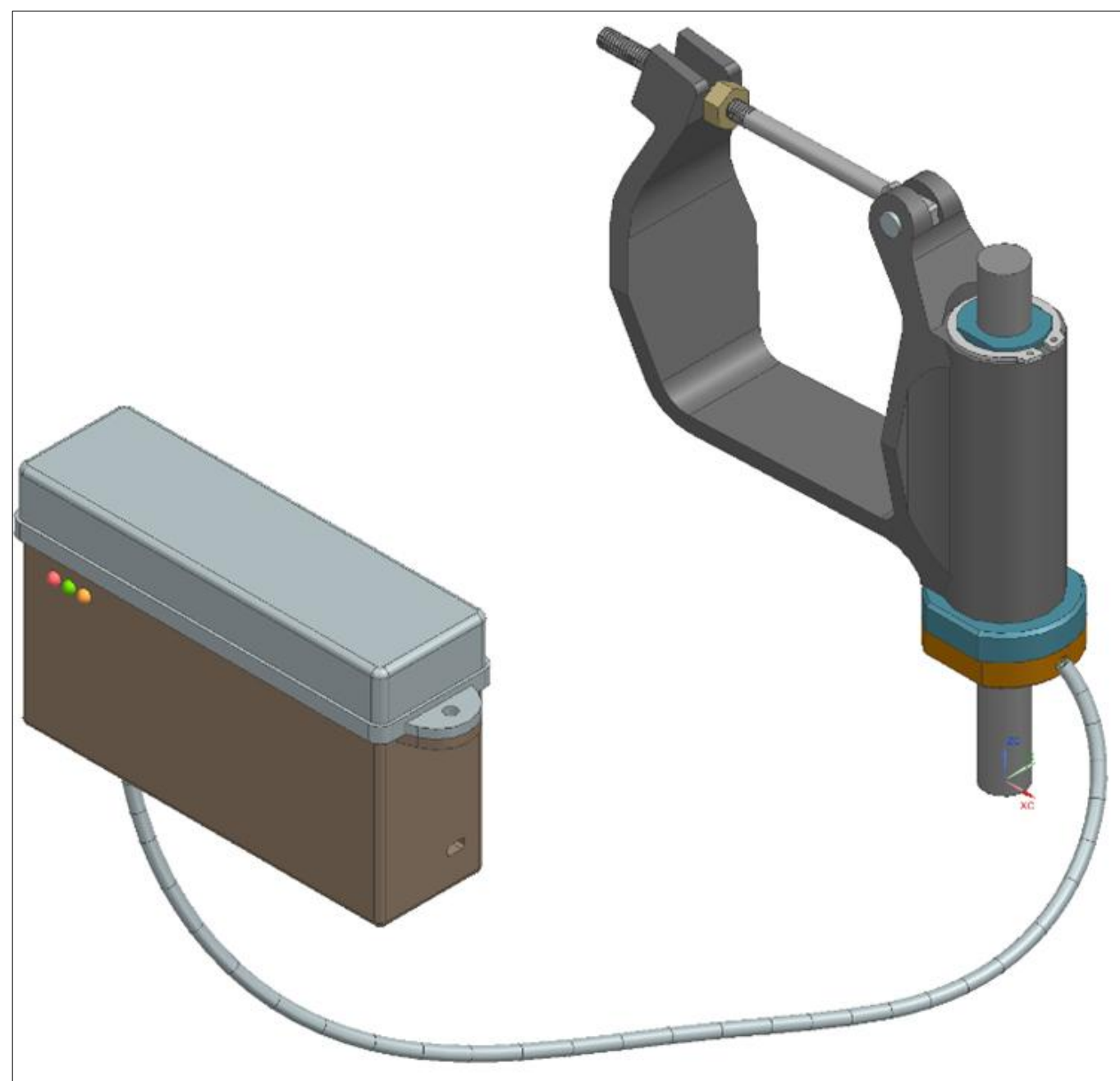
OXFORD BROOKES UNIVERSITY

A Smart Clip-On Sensor That Delivers Real-Time Rowing Feedback to Your Phone

1 Introduction

Smarter Rowing = Safer athletes

- Performance feedback often too expensive or inaccessible
- Poor technique = higher injury risk
- No real-time correction in traditional training
- Need for affordable, live, actionable data
- Reduces risk of overtraining by tracking load and fatigue trends
- RowBot bridges the gap between elite insight & accessibility
- Encourages safer training habits through instant awareness



Sensor & Communication Module show connected by a modelled shield weatherproof wire

Power is the most direct indicator of rowing performance. Unlike stroke rate alone, it tells the full story of effort and efficiency - how hard, how often, and how effectively each stroke is delivered.

- Measures real-time power output
- Highlights inconsistencies in stroke force and timing
- Enables stroke-by-stroke analysis for improvement
- Tracks consistency and peak effort across a session

RowBot turns raw force into actionable insights – every stroke, every session

Sensor & Communication Module show connected by a modelled shield weatherproof wire



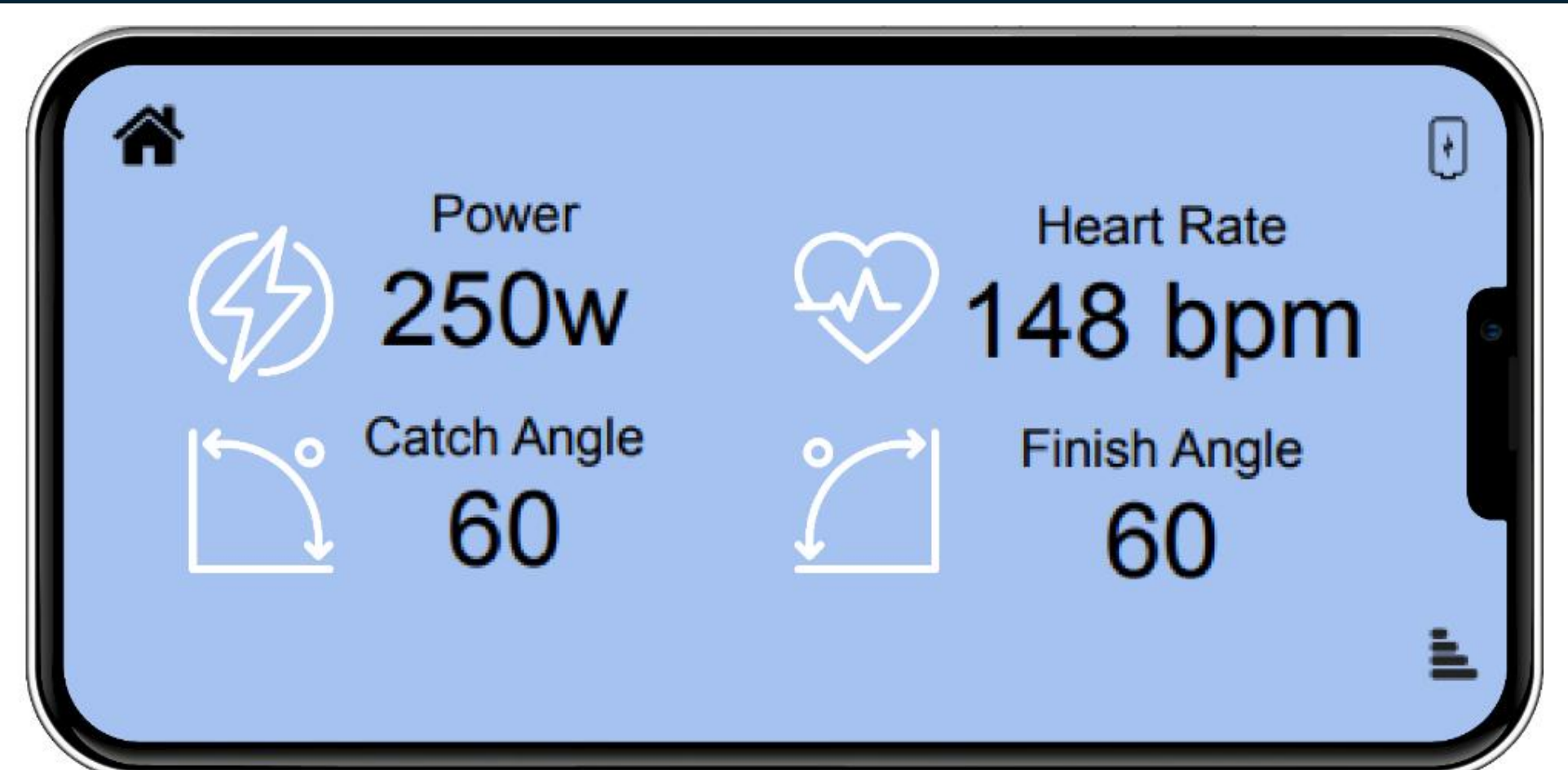
3 Real-Time Performance Feedback at an Arms Length

Live Metrics Displayed on Your Phone:

- Stroke Power (W): Instant and average force output
- Blade Angles: Entry (catch) and exit (finish) positions
- Stroke Rate (SPM): Live pacing feedback

App Benefits for Athletes & Coaches:

- Visual graphs make technique errors easy to spot
- Enables mid-session correction for better outcomes
- Ideal for remote coaching and long-term progress tracking
- Exportable data for post-session review in CSV format



4 Tested with NX & MATLAB

- FEA confirmed structural strength under 2000N gate loads
- Fatigue-tested to withstand 35 million km of rowing
- Safety factor: 2.7× under cyclic load
- Waterproof, vibration-resistant design
- MATLAB processing validated power, rate & angle metrics
- Clean stroke-by-stroke data, ready for real-time feedback

5 Future Progression

Focus: real-world deployment + smarter analytics

- Build waterproof, field-ready prototype
- Begin on-water athlete testing
- Improve live processing – move beyond MATLAB
- Refine housing for mass production
- Add AI-based stroke feedback in mobile app

Train Smarter. Row Faster.