INSTITUTIONAL REVIEW BOARD PROPOSAL FORM

Full Sail University

Form Approved 4/7/22

Section I: Proposal Information

Project Title: Cloud-Agnostic Container Processing Pipeline for KinaTrax: User Experience Evaluation and System Performance Validation

Date of Proposal: November 21, 2025

Starting and Ending Dates of Project, if approved: December 2025 – March 2026

Project Personnel

Principal Investigator: Peter Winkler

Office: Remote/Online

Phone Number: (814) 516-2987

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Department: Computer Science Master's Program (CSMS)

Source of Project Funding

No external funding. This is an academic capstone project for Full Sail University's Computer Science Master's program. Any cloud computing costs will be covered personally or through Full Sail academic resources.

Qualifications of Principal Investigator

Peter Winkler is a Computer Science Master's student at Full Sail University with coursework completed in:

- Advanced Artificial Intelligence
- Human-Computer Interaction (HCI) Application Development
- Data Science and Machine Learning
- Advanced Software Engineering
- Research Approaches in Computer Science

Previous HCI project experience includes developing RaceTraqr, a computer vision-based race timing system with real-time user interfaces. Strong background in software development, cloud infrastructure, and user experience design.

Name/Rank/Title/Department/Role of other Investigators

Faculty Advisor: Dr. Andreas Marpaung

Role: Academic supervisor providing guidance on research methodology, experimental design, and thesis development.

Section II: Risk Category

1. Does your proposal require Institutional Review Board review?

Requires Review? | YES | NO

Justification: This research involves gathering data from human participants through usability testing, surveys, and field studies to evaluate user interfaces and system performance. Findings will be published in the capstone thesis and potentially presented at academic conferences.

2. Select a Risk Category for your proposal

Choose one: EXEMPT | EXPEDITED | FULL

Risk Category: EXPEDITED (Minimal risk)

Justification:

- **No vulnerable populations:** All participants will be adult professionals (18+ years old) in the sports analytics field

- **No biological specimens:** Study involves software system evaluation only

- **Minimal risk:** Participants will interact with web-based dashboards and interfaces – no physical, psychological, or emotional harm

- **Confidentiality maintained:** All user data will be anonymized; no personally identifiable information collected beyond consent forms (stored separately)

- **Standard research methods:** Usability testing, surveys, and observational studies are well-established low-risk methods

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Section III: Project Details

Goals of the Research

Purpose of the Project

This research evaluates a new cloud-based processing system for biomechanical analysis in professional baseball. Currently, analyzing game footage takes 12+ hours due to serial processing

architecture. The new system uses parallel cloud computing to reduce analysis time to under 5 minutes – a 144x improvement.

The research has three main goals:

1. Human-Computer Interaction (HCI): Evaluate user interfaces for asynchronous processing systems, including:

- Real-time processing dashboards that show progress for 1,600 parallel tasks

- Priority request interfaces that let users choose speed vs accuracy trade-offs

- Notification systems (email vs SMS) for alerting users when results are ready

2. System Performance: Measure the actual speedup from parallel processing and validate that cloud processing maintains the same accuracy as the current on-premises system (95% correlation required)

3. Data Science: Analyze the relationship between system performance (processing time, cost) and user satisfaction to identify optimal configurations

What benefits may accrue as a result of this research?

For Participants:

- Early access to cutting-edge sports analytics technology

- Opportunity to influence the design of tools they will use professionally

- Contribution to advancing biomechanical analysis in professional sports

- Potential improvement in their workflow efficiency (12 hours $\rightarrow$ 5 minutes for analysis results)

For the Field:

- Evidence-based design principles for asynchronous processing user interfaces

- Empirical data on cloud parallel processing for sports analytics

- Open-source contributions to cloud-native container orchestration

- Academic publications advancing HCI and Data Science knowledge

For Society:

- Improved athlete safety through faster biomechanical analysis

- Better coaching decisions enabled by same-day post-game review

- Advancement of cloud computing applications in real-time sports analytics

Recruitment of Participants

Selection Process

Participants will be recruited from three professional groups in sports analytics:

1. **Coaches (Target: N=10)** – Baseball coaches who use biomechanical data for training

2. **Analysts (Target: N=10)** – Sports analytics professionals who review game footage

3. **Technical Staff (Target: N=10)** – IT/technical personnel who manage analytics systems

Total Target: N=30 participants

Recruitment Methods:

- Email outreach to sports analytics professionals

- Professional networking (LinkedIn, sports analytics conferences)

- Referrals from KinaTrax partnerships

- Social media posts in sports analytics communities

- Flyers at sports technology conferences (if attending)

Inclusion Criteria:

- Age 18 or older

- Professional experience with sports analytics or coaching

- Familiarity with biomechanical analysis systems (preferred but not required)

- Able to participate remotely via Zoom

- English proficiency for reading interfaces and survey questions

Exclusion Criteria:

- Under age 18

- No professional connection to sports analytics or coaching

- Unable to complete remote participation via video conference

Compensation

Participants will **not** be compensated financially for this study. Participation is voluntary and motivated by:

- Professional interest in advancing sports analytics technology

- Early access to new system capabilities

- Opportunity to influence system design

If participants withdraw early, there are no penalties or loss of benefits (since there is no compensation). Participants can withdraw at any time without explanation.

Potential Risks: Vulnerable populations, Deception, Consent

Informed Consent Process

Written Informed Consent will be obtained from all participants using the following process:

1. Before Participation:

- Potential participants will receive the Informed Consent document via email

- They will be given at least 48 hours to review the document

- They can ask questions via email or video call before agreeing

2. Consent Collection:

- Participants will sign and return the consent form electronically (DocuSign, email, or scanned PDF)

- Consent forms will be stored separately from research data in an encrypted folder

- Research will not begin until signed consent is received

3. Ongoing Awareness:

- Participants will be reminded at the start of each session that they can withdraw at any time

- They will be informed that withdrawal will not affect their professional relationships or access to future versions of the system

Participant Awareness

Participants will be fully informed about:

- **Data Usage:** Responses will be anonymized and used for academic research (capstone thesis, potential conference papers)

- **Confidentiality:** Individual responses will be confidential; only aggregated results will be reported

- **Right to Withdraw:** They can terminate participation at any time, even after providing data

- **Data Retention:** Survey data will be kept for 5 years; consent forms kept separately; both destroyed after retention period

Deception

No deception is planned. Participants will know:

- The study evaluates a new cloud processing system for biomechanical analysis

- We are testing different user interface designs

- We are measuring satisfaction, usability, and performance metrics

No debriefing needed since there is no deception.

Vulnerable Populations

No vulnerable populations will be recruited:

- All participants will be 18 years or older

- All participants will be professionally employed adults

- No incarcerated, mentally ill, or cognitively impaired individuals

- No children, pregnant women, or other protected groups

Special Risk Factors and Safeguards

Minimal Risks:

1. **Time Commitment:** 45–60 minutes per session (usability test or interview)
   Mitigation: Sessions scheduled at participants' convenience; breaks offered

2. **Screen Fatigue:** Extended computer use during usability testing
   Mitigation: Sessions limited to 60 minutes maximum; breaks every 20 minutes

3. **Privacy Concerns:** Sharing professional opinions about analytics systems
   Mitigation: All responses anonymized; no employer names disclosed; data aggregated

4. **Technical Issues:** Potential Zoom connectivity problems
   Mitigation: Backup phone call option; rescheduling available at no penalty

5. **Professional Judgment:** Participants might feel their expertise is being evaluated
   Mitigation: Emphasis that we are testing the SYSTEM, not the USER; no wrong answers

Emergency Protocols:

- If a participant experiences discomfort or stress, the session will be immediately paused or stopped

- Participants can skip any question or task without penalty

- Contact information for Full Sail IRB provided for any concerns

Methodology

Research Design Overview

This study uses a **mixed-methods approach** combining quantitative and qualitative data:

1. **A/B Testing** (N=20 users) – Dashboard comparison

2. **Usability Testing** (N=15 users) – Priority interface evaluation

3. **Field Study** (N=30 games across 20 users) – Notification effectiveness

4. **Surveys** (N=30 users) – Satisfaction and user experience

All research will be conducted **remotely via Zoom** to accommodate participants' locations and schedules.

Study Component 1: Real-Time Processing Dashboard Evaluation

Research Question: Does real-time progress visibility improve user satisfaction compared to generic "Processing..." message?

Hypothesis: Real-time dashboard increases satisfaction by 40% compared to spinner-only interface.

Method:

- **Design:** Between-subjects A/B test

- **Participants:** N=20 users (10 per group), randomly assigned

- **Group A (Control):** Generic "Processing..." spinner with no progress information

- **Group B (Treatment):** Full dashboard with real-time progress bar, ETA, event status, cost tracking

Procedure:

1. Participant connects via Zoom and signs consent form

2. Brief introduction to the system (5 minutes)

3. Participant submits a processing request for a sample game

4. **Group A:** Sees generic "Processing..." message

5. **Group B:** Sees full real-time dashboard with live updates

6. After processing completes (5 minutes), participant completes satisfaction survey

7. Brief interview about their experience (10 minutes)

8. Total session time: 30 minutes

Data Collected:

Satisfaction Survey (1–5 Likert scale):

1. "How satisfied were you with the processing experience?"

2. "How anxious did you feel waiting for results?"

3. "Did you feel informed about the progress?"

4. "Would you use this system again?"

5. "How long did you perceive the wait time?" (minutes estimate)

Behavioral Data (automatically logged, anonymized):

- Actual wait time

- Number of dashboard interactions (refreshes, clicks)

- Time spent viewing different dashboard sections

Qualitative Feedback:

- Open-ended question: "What would improve your experience?"

Analysis:

- Compare satisfaction scores between Group A and Group B (independent t-test, =0.05)

- Compare perceived vs actual wait time (paired t-test)

- Qualitative themes analysis from open-ended responses

Study Component 2: Priority Request Interface Usability

Research Question: Do users understand speed/accuracy trade-offs when choosing processing priority?

Hypothesis: Explicit accuracy percentages improve comprehension; ¿85% of users choose appropriate priority level.

Method:

- **Design:** Task-based usability testing

- **Participants:** N=15 users (5 coaches, 5 analysts, 5 technical staff)

- **Interface:** Priority request form with three options (Rush/Standard/Economy)

Procedure:

1. Participant connects via Zoom and signs consent form

2. Researcher shares screen showing priority interface

3. Researcher presents two scenarios:

    - **Scenario 1:** "You're reviewing footage from yesterday's playoff game. The coaching staff needs insights for today's practice (in 4 hours)."

    - **Scenario 2:** "You're analyzing historical footage from last season for a research project. No deadline."

4. Participant explains their priority choice and reasoning (think-aloud protocol)

5. Researcher asks follow-up questions about understanding of trade-offs

6. Total session time: 45 minutes

Data Collected:

Task Performance:

- Did participant choose appropriate priority? (Yes/No)

- Time to make decision (seconds)

- Confidence rating (1–5 scale)

Comprehension Questions:

- "What does 'accuracy percentage' mean to you?"

- "What's the cost difference between Rush and Economy?"

- "When would you choose Economy priority?"

Usability Metrics (System Usability Scale – SUS):

- 10-item standardized usability questionnaire

- Scores range 0–100; ¿68 is considered "above average"

Analysis:

- Percentage of correct priority choices (target: ¿85%)

- Mean decision time (target: ¡30 seconds)

- SUS scores (target: ¿70)

- Qualitative analysis of comprehension responses

Study Component 3: Notification System Field Study

Research Question: Which notification channel (email only vs email+SMS) drives fastest review of results?

Hypothesis: SMS alerts reduce time-to-review by 50% compared to email only.

Method:

- **Design:** Between-subjects field study over 4 weeks
- **Participants:** N=20 users, each processing 2–3 games (total N=30 games)
- **Group A:** Email notifications only (N=10 users, N=15 games)
- **Group B:** Email + SMS notifications (N=10 users, N=15 games)

Procedure:

1. Participant completes initial consent and onboarding (Zoom call, 15 minutes)
2. Participant sets notification preferences (assigned to Group A or B)
3. Over 4 weeks, participant submits 2–3 processing requests (real or test games)
4. System sends notifications when processing completes
5. System logs when participant first views results
6. After 4 weeks, participant completes final survey (10 minutes, online)

Data Collected:

Time-to-Review:

- Processing completion timestamp
- First user view timestamp
- Difference = time-to-review (minutes)

User Preference Survey:

- "Which notification method did you prefer?"
- "Did you find notifications helpful or intrusive?"
- "Would you want additional notification channels (push, Slack)?"

System Logs (anonymized):

- Number of notifications sent
- Time of day (to identify optimal notification timing)

Analysis:

- Compare mean time-to-review between Group A and Group B (independent t-test)
- Percentage change in review speed

- Qualitative themes from preference survey

Study Component 4: Overall Satisfaction Survey

Method:

- **All participants** (N=30) complete a comprehensive satisfaction survey after their study participation

- **Delivery:** Online (Qualtrics or Google Forms)

- **Time:** 10 minutes

Survey Sections:

1. **System Usability Scale (SUS)** – 10 standardized questions

2. **User Experience (UX)** – Custom questions about dashboard, notifications, and overall system

3. **Demographics** (optional, for analysis only):

   - Professional role (Coach/Analyst/Technical)

   - Years of experience in sports analytics

   - Frequency of biomechanical analysis use

4. **Open-Ended Feedback:**

   - "What did you like most about the system?"

   - "What would you improve?"

   - "How would this system change your workflow?"

Data Anonymization and Confidentiality

Anonymization Process:

1. **Participant IDs:** Each participant assigned a random ID (e.g., P001, P002)

2. **Consent Forms:** Stored separately from research data in encrypted folder

3. **Data Files:** Use participant IDs only (no names, emails, or employer information)

4. **Zoom Recordings:**

   - Used only for transcription of usability sessions

   - Not shared publicly

   - Destroyed after transcription completed

   - Participants can opt out of recording (notes taken instead)

Data Storage:

- **Consent Forms:** Encrypted folder on password-protected computer (5-year retention)

- **Survey Responses:** Qualtrics/Google Forms (anonymized exports)

- **System Logs:** Anonymized user IDs only

- **Transcripts:** Anonymized, stored in encrypted folder

Data Access:

- Only principal investigator (Peter Winkler) and faculty advisor will have access to identifiable data

- Aggregated, anonymized results will be included in capstone thesis

- Individual responses will never be reported

Data Retention:

- Research data: 5 years (academic standard)

- Consent forms: 5 years (kept separately)

- After retention period: All data securely destroyed (digital files deleted, physical documents shredded)

Additional Materials Submitted

The following materials are included with this proposal:

1. **Informed Consent Form** – Document outlining participant rights and study details

2. **Recruitment Email Template** – Sample outreach message to potential participants

3. **Recruitment Flyer** – Visual materials for professional networks

4. **Survey Instruments:**

    - Dashboard Satisfaction Survey

    - Priority Interface Comprehension Questions

    - Notification Preference Survey

    - System Usability Scale (SUS)

    - Overall Satisfaction Survey

5. **Usability Test Script** – Standardized protocol for usability sessions

6. **Interview Questions** – Open-ended questions for post-test interviews

Section IV: Assurances

Assurance Statement

The information provided herein is accurate to the best of my knowledge. Procedures involving human subjects will be performed by trained personnel in accordance with the methods outlined in this proposal. Any changes will be communicated to the IRB Chair prior to implementation.

Principal Investigator: Peter Winkler

Signature: [SIGN ELECTRONICALLY]

Date: November 21, 2025

FOR IRB USE ONLY

IRB Decision: Approved   Approved with Modifications   Tabled   Disapproved

IRB Chair Signature: _____

Date: _____

Comments:

END OF IRB PROPOSAL FORM