UC Bearcat AI Grants Proposal

AI-Powered Industrial Design Career Explorer: Transforming Education at UC

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1 Project Summary

The AI-Powered Industrial Design Career Explorer is an innovative web platform revolutionizing industrial design (ID) education at the University of Cincinnati (UC) by harnessing artificial intelligence (AI) to deliver personalized career path exploration for DAAP students. Built with a React front-end (App.js) and Flask backend (app.py), it leverages natural language processing (NLP) via spaCy and Hugging Face's "all-MiniLM-L6-v2" to map student interests (e.g., sci-fi films) to ID careers (e.g., concept artist) through a conversational interface, stored in MongoDB Atlas. A/B testing evaluates mind map versus grid gallery formats, curating tailored curricula, resources, and Cincinnati-based industry connections. Aligned with UC's "Next Lives Here" vision, the app fosters academic excellence, urban impact through job creation in Cincinnati's design and technology sectors, and pedagogical innovation. A pilot with 50 DAAP students, commencing mid-June 2025, will assess enhanced ID interest and career clarity, establishing a scalable model for personalized education across UC.

2 Project Description

2.1 Background and Significance

The expansive scope of industrial design—from product development to concept art—poses challenges for students seeking to align personal passions with career trajectories. Conventional advising often lacks the precision to bridge individual interests with specific ID subfields. The AI-Powered Industrial Design Career Explorer addresses this gap through an AI-driven platform that delivers adaptive, interest-specific career guidance. Its MongoDB Atlas database (career-exploration) stores student profiles (interests, talents, selections, metadata), while a separate ai_training_db captures anonymized data for pattern recognition. NLP processes inputs (e.g., "I love sci-fi movies") to generate career suggestions (e.g., "Concept Artist: Innovate visuals for sci-fi films") with a 60/40 weighting of interests and talents. Inspired by adaptive learning systems, this approach enhances the discipline's innovative nature.

AI in Teaching: A Primer for the Committee

AI in education employs computational models to analyze student data and deliver customized learning experiences. For ID students, the app's /prompts endpoint generates dynamic conversational prompts, recommending courses (e.g., 3D modeling) and projects (e.g., prototyping futuristic interfaces) tailored to inputs. Unlike static curricula, AI adapts in real-time, amplifying motivation by aligning education with individual passions. For reviewers, AI functions as a scalable mentor, personalizing guidance for UC's diverse student body, particularly in ID's innovative context.

2.2 Objectives

- Develop an AI-driven platform to align student interests with ID career paths.

- Curate personalized curricula and resources to heighten ID enthusiasm.

- Facilitate Cincinnati-based industry connections to clarify career ambitions.

- Evaluate the platform's impact on ID interest and career goal relevance.

2.3 Methodology

The project will unfold in three phases over one year (June 2025–April 2026):

1. Development (June–August 2025): Construct the platform using React (App.js) for a conversational front-end with animated gallery formats (mind map/grid, react spring) and Flask (app.py) for backend endpoints (/prompts, /profiles, /update_data). MongoDB Atlas (career-exploration) stores profiles, with ai_training_db capturing anonymized data (interests, talents, metrics, schema version "1.0"). The /prompts endpoint uses spaCy and Hugging Face's "all-MiniLM-L6-v2" for NLP, with a real-time/batched toggle and failsafe (2 retries, fallback prompts). Ethical AI practices include transparent algorithms, bias mitigation, and secure data handling, leveraging DAAP's AI expertise.

2. Pilot Implementation (September–December 2025): Deploy to 50 DAAP ID students, initiating A/B testing (mid-June 2025) to compare gallery formats. Feedback will be collected via in-app surveys (e.g., "How did the app clarify career goals?") and focus groups, supported by faculty collaboration, to refine functionality.

3. Evaluation and Scaling (January–April 2026): Assess outcomes through surveys and interviews, targeting 90% increased ID interest and 85% career relevance. Present at the UC AI & Emerging Tech Symposium (February 2026) and submit reports, exploring scalability to other DAAP disciplines.

2.4 Ethical AI Considerations

The platform prioritizes ethical AI:

- Transparency: Articulates recommendations (e.g., "Sci-fi interest suggests concept art due to visual creativity").

- Fairness: Mitigates bias (e.g., gender-neutral suggestions) via DAAP diversity committee validation.

- Privacy: Employs anonymized, FERPA/GDPR-compliant storage with encryption in MongoDB Atlas.

- Societal Impact: Promotes inclusive education, reducing barriers for underrepresented students.

- Accountability: Integrates feedback loops for students to report issues, refining algorithms.

3 Pedagogy Focus

The platform redefines pedagogy by delivering AI-driven, individualized learning paths, aligning with UC's academic excellence objective. For a student interested in sci-fi, it

recommends courses (e.g., interaction design) and projects (e.g., "Design a futuristic interface"), enhancing engagement. Faculty access progress via /profiles metadata (e.g., confidence scores, interaction metrics) for targeted feedback, optimizing outcomes. Resources (e.g., Coursera tutorials) align skills with career aspirations, fostering ID enthusiasm. Collaboration with UC's Applied AI Lab ensures robust pedagogical integration, making education relevant and creative for ID's diverse subfields.

4 Student Life Focus

The platform enhances student life, supporting UC's urban impact mission:

- Interest in ID: Conversational prompts ignite excitement for ID subfields.

- Career Clarity: Dynamic career boxes (e.g., "Concept Artist: Innovate sci-fi visuals") reduce uncertainty.

- Career Education: Connects students to Cincinnati's design industry (e.g., Procter & Gamble) via curated contacts, fostering job creation.

- Alumni Engagement: Links to UC ID alumni, strengthening community.

A mobile-friendly interface ensures accessibility, promoting engagement and connections.

5 Expected Outcomes

- Quantitative: 90% of students report increased ID interest; 85% find the platform relevant to career goals; 80% satisfaction rate (surveys).

- Qualitative: Heightened ID enthusiasm; clearer career ambitions; enhanced UC-industry ties, driving Cincinnati metro job growth in design and technology.

Scalability includes adaptation for other DAAP disciplines, amplifying impact.

6 Timeline

- June–August 2025: Develop platform and databases.

- September–December 2025: Pilot with 50 students (A/B testing mid-June); mid-year report (November 14, 2025).

- January–February 2026: Evaluate pilot; present at UC AI Symposium (February 2026).

- March–April 2026: Finalize evaluation; end-of-year report (April 17, 2026).

7 Budget

Total: $5,000

- Personnel ($3,000): AI developer (10 hours/week, 3 months), student assistant for surveys.

- Technology ($1,000): AWS hosting, MongoDB Atlas, open-source tools (spaCy, Hugging Face).

- Resources ($500): Free tutorials, symposium materials.

- Evaluation ($500): SurveyMonkey, focus group incentives.

The budget leverages UC infrastructure for efficiency.

8 Qualifications

John Violette (PI), Adjunct Professor at UC DAAP, brings 26 years of ID experience (footwear, toys, entertainment) and expertise in AI implementation, mentoring students, and collaborating on UC AI initiatives.

9 Alignment with UC's Strategic Direction

The platform aligns with "Next Lives Here":

- Academic Excellence: Personalizes education, enhancing outcomes.

- Urban Impact: Drives job creation in Cincinnati's design/technology sectors (e.g., Procter & Gamble partnerships).

- Innovation: Pioneers AI-driven pedagogy, positioning UC as a leader.

Collaboration with UC's Applied AI Lab strengthens alignment.

10 Conclusion

The AI-Powered Industrial Design Career Explorer redefines ID education with ethical AI, igniting student enthusiasm and fostering Cincinnati job growth. Aligned with UC's vision, we request $5,000 to deliver this transformative, scalable solution.