Statement of Objectives - Daniel Pace
Ph.D. in Psychology, Engineering Psychology Focus | Oregon State University

I'm applying to the Engineering Psychology program at OSU to study how people make decisions under uncertainty, particularly in environments where cognitive load is high and systemic support is low. I'm interested in whether we can predict decision failures not by analyzing what people choose, but by analyzing the structure of the information environment they're choosing within.

This question is both personal and practical. As a late-diagnosed neurodivergent adult, I've spent decades reverse-engineering implicit rules in systems designed for uniform cognition. As a software developer and interface designer, I've watched people struggle with tools that assume everyone processes information the same way. The gap between how systems are built and how minds actually work is both measurable and fixable.

Over the past three years, I've developed a computational framework for modeling decision processes using relational primitives. I've implemented this in four working applications, including an interactive decision-support tool and agent-based cognitive simulations. Testing shows that decomposing complex scenarios into structural features (role clarity, information flow, feedback loops) produces consistent diagnostic scoring of decision stability across different user contexts.

My research at OSU would focus on three questions:

1. Structural fragility in decision environments: Can we predict when someone will make a poor choice by analyzing the topology of their information environment rather than the content of the choice itself? What structural patterns (missing feedback, ambiguous constraints, contradictory signals) reliably precede decision errors?
2. Cognitive scaffolding without agency loss: What specific interface interventions reduce executive function load without eroding user autonomy? How do we design tools that support reasoning rather than replace it, especially for neurodivergent users?
3. The ethics of interface influence: How do we distinguish between designs that scaffold cognition versus those that manipulate it, and can we quantify that distinction?

I'm drawn to OSU specifically because of the work happening in Dr. Macuga's CARVE Lab on human-AI interaction and interface design. My work on natural language processing adapters for cognitive tools aligns directly with that research. Dr. Sanchez's ACTUAL Lab offers the ideal environment to study how individual differences in attention and visuospatial processing shape technology use. And Dr. Bugatti's work on AI-augmented therapeutic systems intersects with my core concern: ensuring that automated support systems are not just effective but ethically grounded.

My background is unconventional. I've worked in the military, nonprofits, fast food, warehouses, and software development. I taught myself to code while raising four neurodivergent children. I've been studying psychology since I was 13, initially as a survival strategy. That trajectory has taught me to design for real constraints, not ideal users, and to judge theory by whether it actually functions under pressure.

I'm pursuing a PhD because I want the methodological infrastructure to test these tools rigorously. I want to publish work that other researchers can build on. I want the credentials that let me do this work without constantly justifying why someone without a traditional path deserves to be taken seriously.

I believe better cognitive tools are not just possible but necessary. I want to build them, test them, and put them in the hands of people who need them most.