At NPS, faculty members focus on education and research conducted specifically to increase the combat effectiveness of commissioned officers.

In my role, I am primarily responsible for conducting research and publishing results that directly support the needs and goals of the Navy, as well as the application of that research directly into the NPS curriculum to ensure that the education of NPS students remains relevant and current.

My work has focused on the integration of system architecture products with system analysis techniques, specifically the development of operational and combat models, through model-based systems engineering.

That research approach, termed Capabilities Focused Model-Based Systems Engineering (CF-MBSE), is conducted in direct support of broader Navy research projects.

One of my primary goals is to integrate my research experiences with student thesis research, please click on the links below to find out more about my research and teaching interests, as well as to review past and current projects and explore thesis opportunities.

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**Capabilities Focused Model-Based Systems Engineering: Research & Applications**

**System Definition**

1. **Requirements Definition**
   - Initial system requirements are established and an architecture model is selected.
2. **Architecture Definition**
   - DoDAP and DoDDL compliant architectures are defined to support operational and combat models.

**System Modeling**

1. **Baseline Modeling**
   - Detailed models (wherever agent-based, system dynamics are needed) are used to represent an initial system configuration.
2. **Experimental Design**
   - A broad set of input/output combinations, operational conditions, and environmental conditions are defined.
3. **Simulation Modeling**
   - Each system configuration specified in the experimental design is replicated to capture variability and expand/extrapolate simulation results.

**System Analysis**

1. **Model Analysis**
   - Statistical analysis tools and techniques are used to identify the variables and interactions that have the most significant impact on system performance.
2. **Dynamic Decision Support**
   - Statistical meta-models are developed or surrogate models that are used to test decision support models.
3. **Reporting & Documentation**
   - Recommended system configurations and design decisions are summarized in written reports, charts, and graphical presentations.

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**Capabilities Focused Model-Based Systems Engineering: Academic Foundations**