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LEADERSHIP INSTITUTE

Prepare for the Future

A SYSTEMS ARCHITECTURE & MANAGEMENT CERTIFICATE PROGRAM

SCTE • ISBE
In partnership with Cornell University's
Engineering and ILR Schools

Envisioning the Future of Connectivity, Today.

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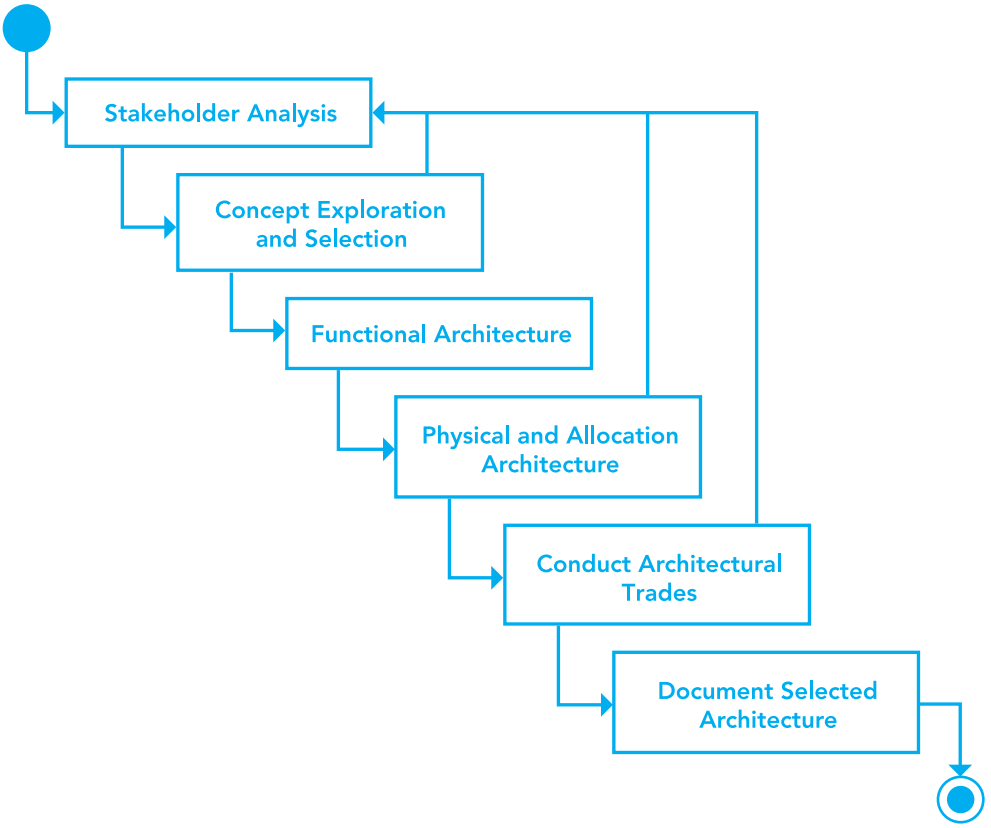
10G

PREPARING FOR THE FUTURE

Today's environment requires accelerating the development of 10G, the next network to life. Equipping engineers with a set of tools, concepts, methods, mental models and principals is essential for individuals to achieve successful systems architectural projects by:

- Engaging Stakeholders
- Managing Complex Scenarios
- Producing Robust Solutions
- Analyzing and Discovering Architecture Space

A SYSTEMS ARCHITECTURE PROCESS



Develop Systems Architecture Capabilities to Lead a Virtual Program Delivered by Cornell University

Studying the theory and practice of systems architecture examines a range of disciplines: Systems Engineering, Decision Analysis, Stakeholder Analysis, Formal Design Theory, Simulation, Global Optimization, Design of Experiments, Data Mining and Visualization, and Project Management.

The application of these concepts to business projects will quickly advance the development and implementation time and ROI, making a significant difference in bringing 10G to market.

Limited to 20 participants, this highly interactive learning program will prepare individuals to lead complex systems architecture projects within their companies.

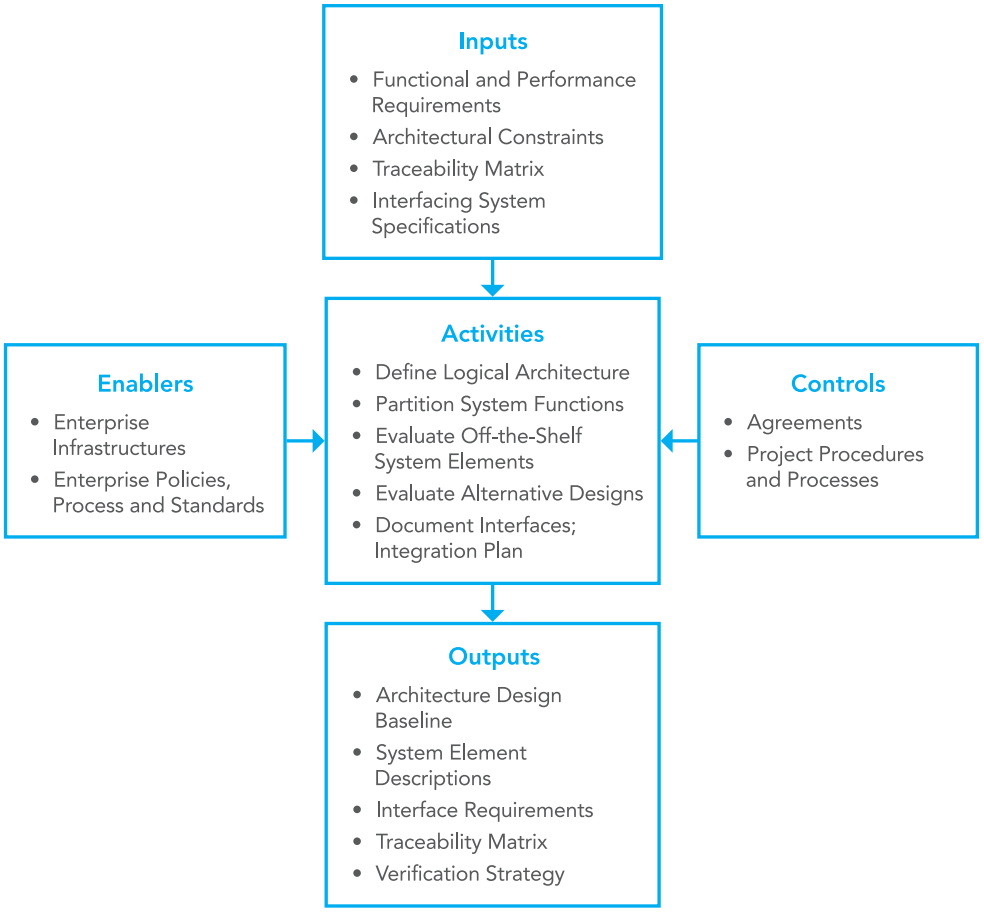
Over five months, participants will engage in action learning to apply theories and concepts to an assigned team project to solve complex problems. Three phases of study include: **Ramping Up** preparing for the team project, **Immersion** working with team members on a "real time" project and **Completion** presenting project outcomes, receiving faculty coaching, and sharing and reflecting on feedback received during the project experience.

Month One: Ramping Up

Produce a complete representation of a system architecture including its concept of operations, functional architecture, physical architecture, and mapping of function to form, using a formal systems modeling language (SysML, OPM).

Become familiar with the major architectural frameworks (DODAF) characterize and prioritize stakeholders and their needs using network theory and Kano analysis training necessary to do their jobs. In the same survey referenced earlier, this factor causes 40% of people to leave their jobs within the first year.[1] At that point, the MSO has not only lost the valuable knowledge the technician acquired, but it now has to invest in recruiting, hiring, and onboarding a replacement.

TASKS OF THE SYSTEM ARCHITECT



Project Challenge Example: Integration of DOCSIS® 4.0 into the 10G Vision Developed to satisfy bandwidth requirements for multiple system operations.

Solving the Challenge: Traditional approach has relied on project or program managers to bring in expertise from distinct areas of the network. Ensuring the convergence of complex, interdependent technologies, among various teams into a holistic system engineering approach is essential.

Months Two to Four: Immersion

Engage in formal brainstorming methods and enumerative algorithms to generate large spaces of alternative concepts and architectures.

Develop computer models (parametric models, simulation) to assess the relative value of system architectures across all important metrics, including performance, lifecycle cost, schedule, risk, and others.

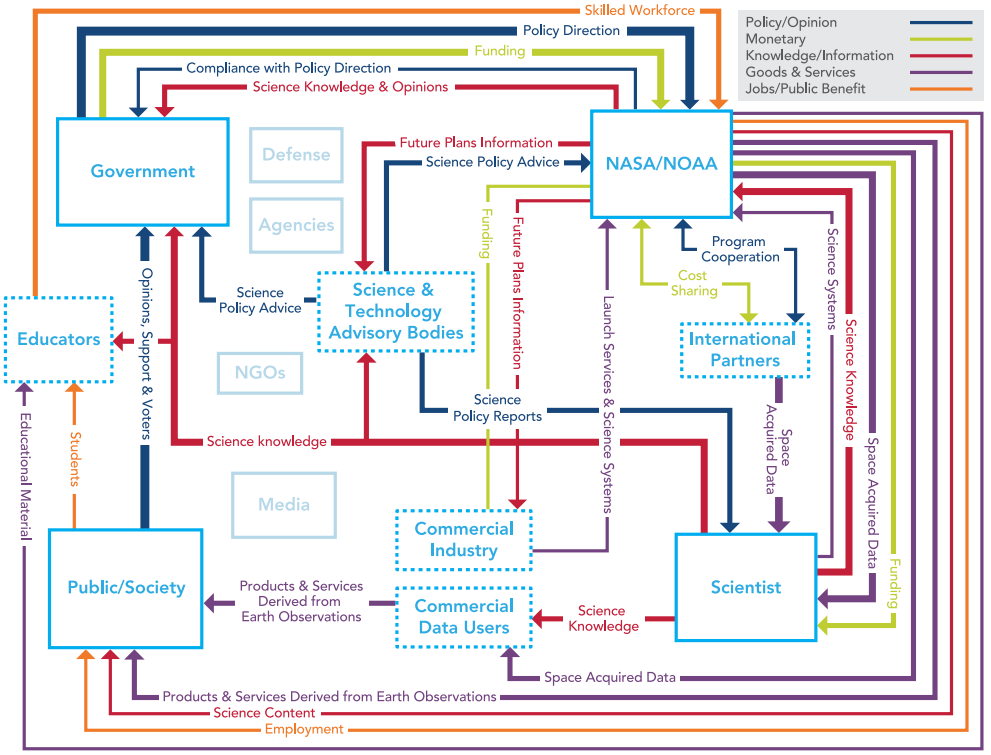
Use optimization (evolutionary algorithms) to fully or partially explore the architectural trade space and find a set of "good" architectures.

Apply concepts from design of experiments, sensitivity analysis, data mining, and machine learning to discover the structure of the trade space and obtain insights.

Analyze the flexibility, modularity and robustness of system architectures.

Increase awareness and understanding of diversity and implicit bias in teamwork communication, decision-making, and peer assessment.

LEARN FUNDAMENTALS, REPRESENTATION AND FRAMEWORKS



Month Five: Completion

Critique a system architecture, identifying its strengths and weaknesses.

Examine principles of good (and examples of bad) systems architecture by real practitioners from different domains, including aerospace, civil architecture, and software.

Increase awareness and understanding of diversity and implicit bias in teamwork communication, decision-making, and peer assessment.

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LEARNING OUTCOMES

- Produce a complete representation of a system architecture including its concept of operations, functional architecture, physical architecture, and mapping of function to form, using a formal systems modeling language (SysML, OPM)
- Characterize and prioritize stakeholders and their needs using network theory and Kano analysis
- Develop computer models (parametric models, simulation) to assess the relative value of system architectures across all important metrics, including performance, lifecycle cost, schedule, risk, and others
- Increase awareness and understanding of diversity and implicit bias in teamwork communication, decision-making, and peer assessment

PROGRAM FACULTY

Dr. Gao, Director of Cornell Systems Engineering Program, is a Professor in the graduate fields of 1) Systems Engineering; 2) Computing and Information Science; 3) Cornell Institute of Public Affairs (CIPA); and 4) Civil and Environmental Engineering at Cornell University. Gao is an international leading expert in complex urban systems (e.g., urban technology, infrastructure and transportation innovation for healthy living in sustainable communities). His research focuses on modeling and development of systems methods and solutions for sustainable and intelligent infrastructure systems, low carbon and low emission transportation networks, and human-centered design. Aiming to transforming how scientists, engineers, managers, and leaders confront complex systems

Gao's research and teaching are changing the way individuals and organizations approach engineering, business, and societal problems. Tackling today's complex global challenges requires engineers, scientists, managers, and leaders who have interdisciplinary skills and understand, analyze, and solve strategic as well as operational problems from a systems perspective. Gao's work is training a new generation about system-level skills and talents — developing experts in systems science, engineering, leadership, and enterprise with a strong emphasis on systems thinking, data analytics, and system intelligence. Before joining Cornell, Gao was a QUANT in the mathematical and econometrical modeling division at the Rohatyn Group, LLG, a Wall Street hedge fund specializing in emerging markets including the BRIC countries.

Dr. Oliver Gao
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