

NCSEA Foundation + Artificial Intelligence = Clarity & Empowerment for the Structural Engineering Profession

The NCSEA Foundation is leading the structural engineering (SE) profession in harnessing Artificial Intelligence (AI) to shape the built environment. This Roadmap developed by the NCSEA Foundation's Project Team for the 2024 Innovation in Structural Engineering Grant Program on AI demonstrates where the profession is today and where it could be in the future.

2024 Today	Short-Term	Long-Term	Future
Learning and Strategy			
<ul style="list-style-type: none">• Learning and discovering applicable AI tech• Establish an AI policy and strategy, determining whether to approach it as a developer, consumer, or mix of both; develop the strategy accordingly• Set financial goals for tech/AI investment and get buyoff from stakeholders		<ul style="list-style-type: none">• Identify client and market needs for transformative innovation from SE's• Train staff to meet goals of tech and AI strategy• Continuous improvement and assessment of strategy• Establish what data is valuable to business model, even if it's messy	
Develop, Implement and Engage			
<ul style="list-style-type: none">• Leverage AI to solve straightforward problems for engineering• Use AI tech in PM workflows to free up valuable time• Launch pilot projects, new software process, show the value of AI (or not)• The trained become the trainers and spread the knowledge of new tech		<ul style="list-style-type: none">• Early feedback from staff and clients' strategy• Collect and structure valuable private and public data aligned with strategy• Promote early successes with staff, clients and industry• Continuous learning and understanding ever changing tech market	
Growth and Focusing Strategy			
<ul style="list-style-type: none">• Assess growth/success of initiatives from within and competitors, startups• Polish strategy around efficiency, client satisfaction, downstream processes• Refine existing AI tech initiatives to improve efficacy and add value• Plot and develop second generation tools, consider new vendor tools		<ul style="list-style-type: none">• Leverage private and public data to inform new tech and designs• Understand changing needs of clients/partners as industry fully adopts AI tech• Consider alternative pricing, project delivery, and contracting strategies• Establish goals for increasing scope, assessing risk and reward	
Disruption and Transformation			
<ul style="list-style-type: none">• Assess startups and competing AI-infused SE firms, their strategy, their marketing and value, and transformative business practices and value• Develop internal innovative business practices to compete with traditional methods, challenge the "way it's always been done"• Refine strategies to maintain competitiveness and value to clients		<ul style="list-style-type: none">• Continue growth of AI initiatives with robust development and tech implementation• Train staff to widely leverage technology solutions across the firm, in all positions• Find your place for disruption; expand business models, take more risk and scope	

The AI Implementation Plan developed by the AI Project Team to support the first phase of the Roadmap includes three major initiatives. Projects within each initiative will provide practical applications of AI in the SE profession.

AI Education

- **Support SEs in advancing their understanding and use of AI**
 - Policy & Guidance: AI acceptable use, Data security, Cost data, Ethical guidance, Legal framework
 - Instruction: AI strategy examples, Research highlights, Short courses
 - Knowledge Sharing: Local SEA forums, Online articles

AI Tools & Innovation

- **Provide information about AI tools, policies, and innovations that SEs can use in their work**
 - Datasets for Machine Learning
 - Using Large Language Models (LLM)
 - Tool Sharing and Example Workflows
 - Awareness of real-world applications using AI

AI Partnerships

- **Pursue education and research partnerships advancing the use of AI in structural engineering**
 - University Partnerships
 - AEC & SE Industry Partnerships
 - Events: Hackathons, Virtual Competitions, Research Collaboration