

Scholarship Award Presentation

Award Committee:

Mark Magalotti, Chair

Jason Molinero

Brian Wall

Ed Skorpinski

Rich Barcaskey

Scholarship: 3 rotations with \$1,500 scholarship upon the completion of each rotation

Essay theme: Rehabilitation of Transportation Infrastructure to be More Resilient from the Design and Construction Perspective

Gabriel Salgado

2nd Term Sophomore

Focus area: Transportation infrastructure

Member of

- Pitt debate team
- Model Unified Nations
- Engineers w/out Borders

First rotation: Allegheny County



IRISE: Year 5 Program

Presenter: Gary Euler, Associate Director



Formulating the Program

- ❑ December 2 Brainstorming session
 - ❑ Preceded by individual Zooms
- ❑ Steering Committee review of short problem statements prepared by faculty
- ❑ Recommended set of projects to Steering Committee
 - ❑ PennDOT agreed to support two others
- ❑ Development of draft project scope statements
 - Review by Steering Committee representatives
- ❑ Development of final project scope statements based on comments received



Year 5 Projects

- ❑ Stormwater Seminar Series
- ❑ VR Training Platform for Construction Workers
- ❑ Two-Lift Concrete Pavements
- ❑ Dowel Corrosion Effects
- ❑ Asphalt Seal Coat Best Practices
- ❑ Metamaterial Concrete Development
- ❑ Bridge Deck Corrosion Structural Optimization

Stormwater Seminar Series

- ❑ The Problem: Need to better coordinate regional stormwater management
- ❑ Approach: Conduct a series of seminars similar to the successful Landslide Capacity Building seminars.
 - Broad participation including students
 - Focus on sub-topic at each seminar
- ❑ Duration: 12-months
- ❑ Cost: \$20,000
- ❑ PI: Dan Bain

VR Training Program for Construction Workers

- ❑ The Problem: Need for better and more frequent H&S training for construction workers
- ❑ Approach: Develop an immersive Virtual Reality environment training platform
 - Digital representation of a construction site
 - Random insertion of hazards (gaming)
 - Objective monitoring of learning progress
 - Duration: 24-months
- ❑ Cost: \$220,000
- ❑ PI: Alessandro Fascetti

Two-Lift Concrete Pavements

- ❑ The Problem: Use of high-quality concrete at the bottom of a design is unnecessary and environmentally unfriendly
- ❑ Approach:
 - Laboratory testing of different mixes
 - Design guidelines and section design
 - Construction and assessment
- ❑ Duration: 24-months
- ❑ Cost: \$210,000
- ❑ PI: Lev Khazanovich

Dowel Corrosion Effects

❑ The Problem:

- Dowel corrosion leads to decreased long-term performance of jointed concrete pavements.
- Long term dowel corrosion resistance not well understood.

❑ Approach:

- Identification of critical factors through modeling
- Accelerate laboratory testing
- Development of prediction models
- Development of design guidelines

❑ Duration: 24-months

❑ Cost: \$250,000

❑ PI: Julie Vandebossche

Asphalt Seal Coat Best Practices

- ❑ The Problem: Variability in seal coat performance reported by State DOTs
- ❑ Approach:
 - Collect and analyze best practices from DOTs and contractors, including design, construction and inspection
 - Collect current practice information from IRISE members
 - Compare and develop recommendations
- ❑ Duration: 15-months
- ❑ Cost: \$90,000
- ❑ PI: Eishan David, University of New Hampshire

Metamaterial Concrete Development

- ❑ The Problem: Challenge in developing light-weight concrete (LWC) with low density and high strength
- ❑ Approach:
 - 3D print a range of metamaterial lattices
 - Conduct experimental studies to evaluate the properties of LWC beams and cubes reinforced by the metamaterial lattices
 - Develop recommendations
- ❑ Duration: 24-months
- ❑ Cost: \$250,000
- ❑ PI: Amir Alavi

Bridge Deck Corrosion Structural Optimization

- ❑ The Problem: Need to quantitatively assess the technical and economic benefits associated with different corrosion mitigation strategies
- ❑ Approach:
 - ❑ Produce quantitative measures of the effectiveness of combining different mitigation strategies in terms of extended life-span and reduced corrosion rates
 - Develop practical guidelines for the optimal design and adoption of corrosion-resistant measures
- ❑ Duration: 24-months
- ❑ Cost: \$200,000
- ❑ PI: John Brigham

Contributions and Allocations

Project	Cost Estimate
Stormwater Seminar Series	\$20,000
VR Training Platform for Construction Workers	\$220,000
Two-Lift Concrete Pavements	\$210,000
Dowel Corrosion Effects	\$250,000
Asphalt Seal Coat Best Practices	\$90,000
Metamaterial Concrete Development	\$250,000
Bridge Deck Corrosion Structural Optimization	\$200,000
TOTAL	\$1,240,000