

# IRISE 2021 ANNUAL REPORT



Presenter: Julie Vandebossche, PhD, PE

# IMPACTFUL RESILIENT INFRASTRUCTURE SCIENCE AND ENGINEERING (IRISE)

- ❑ Developing sustainable, resilient, engineering solutions
- ❑ Improving worker safety



# UNIQUE APPROACH



## MISSION: Implementable solutions

- Identify a deficiency/challenging issue
- Develop impactful technology
- Benefit seen by all parties (buy-in)

## Approach...

- Get all parties involved early in the process
- Maintain their involvement throughout the process



# WE ARE INDEBTED TO OUR MEMBERS

 - Denotes Founding Members





# WE ESPECIALLY THANK OUR 2021-22 STEERING COMMITTEE

- **Rich Barcaskey**, CAWP
- **Chuck Niederriter**, Golden Triangle Construction
- **Michael Schultz**, Pennsylvania Turnpike (*Edward Skorpinski*)
- **Stephen Shanley**, Allegheny County
- **Brian Wall**, PennDOT
- **Tom Zagorski**, Michael Baker International
- **Yathi Yatheepan**, FHWA (ex officio)

**WE WELCOME OUR NEWEST MEMBER!**

**CDR | MAGUIRE  
ENGINEERING**

\* Dan Cessna – Steering Committee



# ONGOING RESEARCH

## Eleven on-going projects

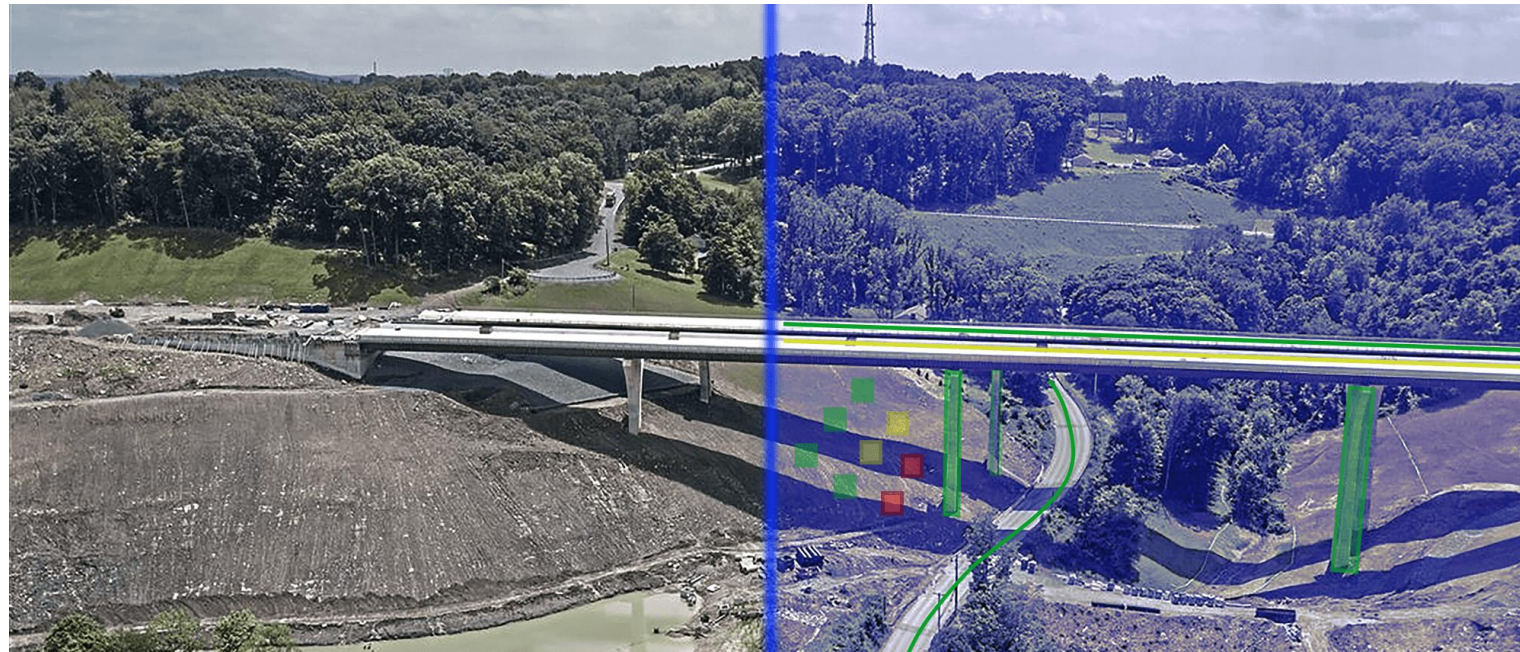
1. **Assessing Benefits**
2. **Construction**
  - Additive Manufacturing and ABC
3. **Landslides**
  - Best Practices
  - Data Inventory
4. **Pavements**
  - Concrete Compaction/Vibration
  - Distresses under Pavement Markings
  - Joint Sealing/Design Optimization
  - Material Compatible Repair Field Assessment
5. **Worker safety**
  - Construction safety data analysis
  - Tech Innovations
  - Utility location





# PA TURNPIKE: Climate Resilient Corridor

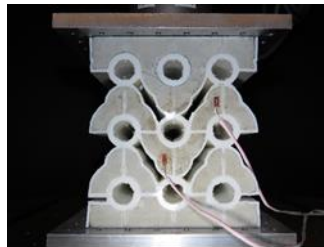
1. Sound Walls Constructed of Metamaterials
2. Digital Twin of Ecosystem (pavement/bridge/stormwater basin)
3. Electric Vehicle Charging
4. Multi-purpose Assets: Energy Harvesting



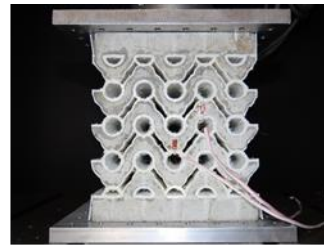
# YEAR 5 WORK PROGRAM TOPICS

## 7 New projects

- **Corrosion:** bridge decks and dowel bars
- **Materials:** development of metamaterial light-weight concrete
- **Pavements:** two-lift and sealcoating
- **Safety:** virtual reality worker training
- **Stormwater:** seminar series



(a)



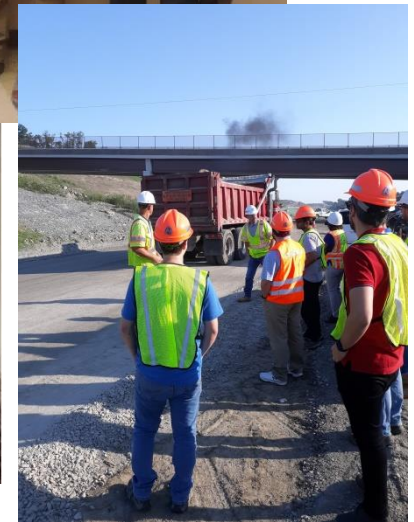
(b)



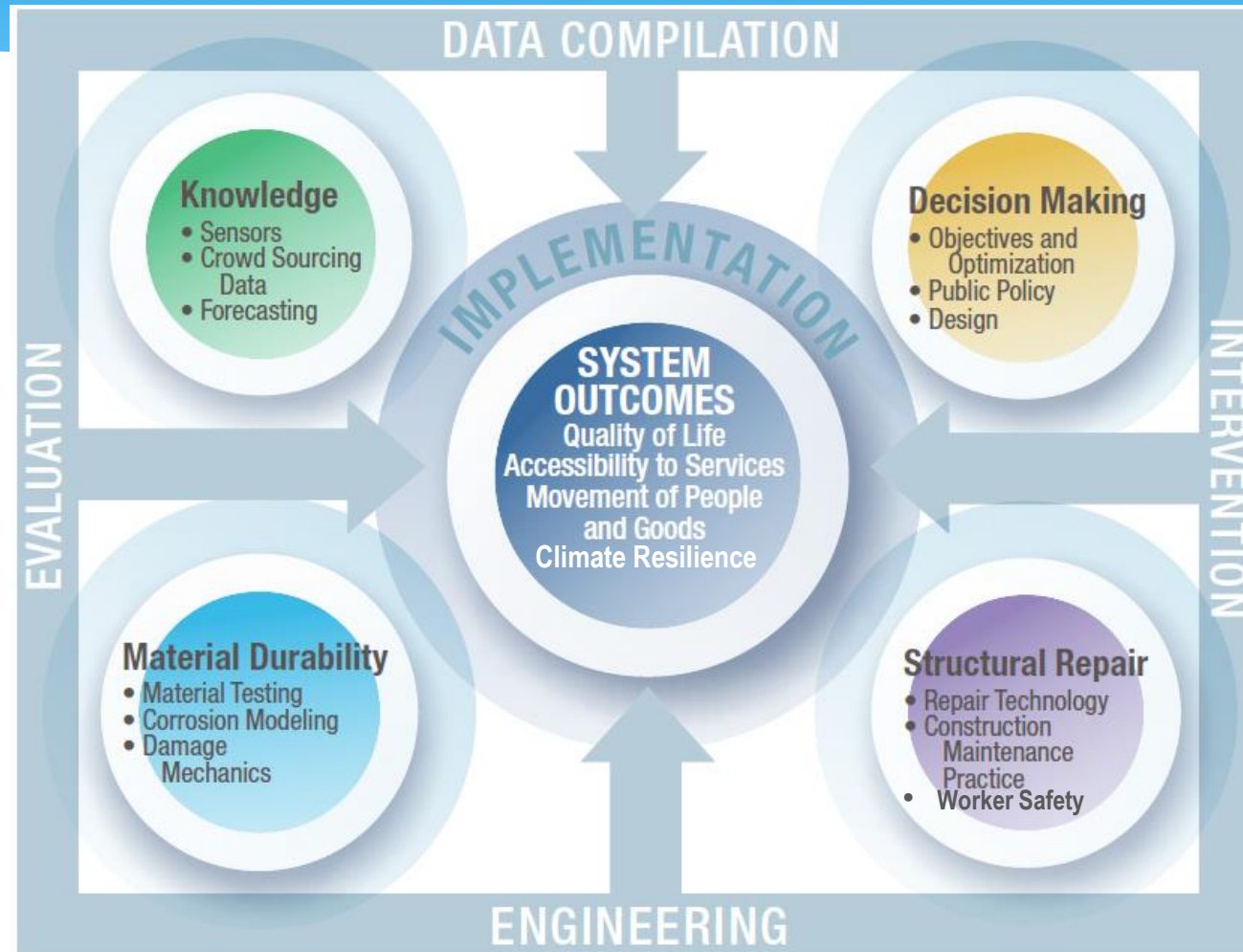


# STUDENT INVOLVEMENT

- 3 post-doctoral fellows
- 10 graduate/undergraduate students
- Conference presentations
- Awards
- Class projects/site visits
- Coop/internship scholarship program



# IRISE RESEARCH DIRECTION



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# UPDATED IRISE RESEARCH DIRECTION

## Year 1

- **Material compatible repair**
- Corrosion
- Microbial concrete
- Pitt Rigid

## Year 2

- Bridge assessments
- Early opening
- Landslide workshop
- Landslide seminars

## Year 3

- Benefit analysis
- JPCP Jt Design Opt.
- Landslide best practices
- AC pavement markings
- Safer pave. construction
- MCR Implementation

## Year 4

- ABC Construction
- Construction safety
- Landslide inventory
- Utility location
- Vibration compaction



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## Year 1

- Material compatible repair
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## Year 2

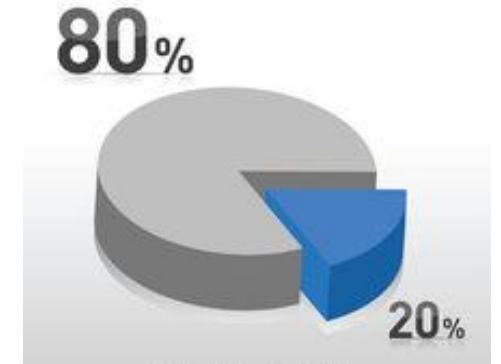
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## Year 4

- **ABC Construction**
- Construction safety
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- **Vibration compaction**



80% Applied  
 20% High risk/high reward

**CURRENT = 21%**

# IRISE RESEARCH DIRECTION



## Proposed Year 5

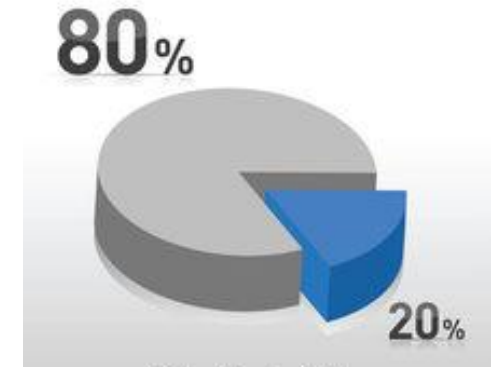
- Bridge deck corrosion
- Dowel corrosion
- LWC Metamaterials
- Seal coat best practices
- Stormwater seminars
- Two-lift paving
- VR safety



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## Proposed Year 5

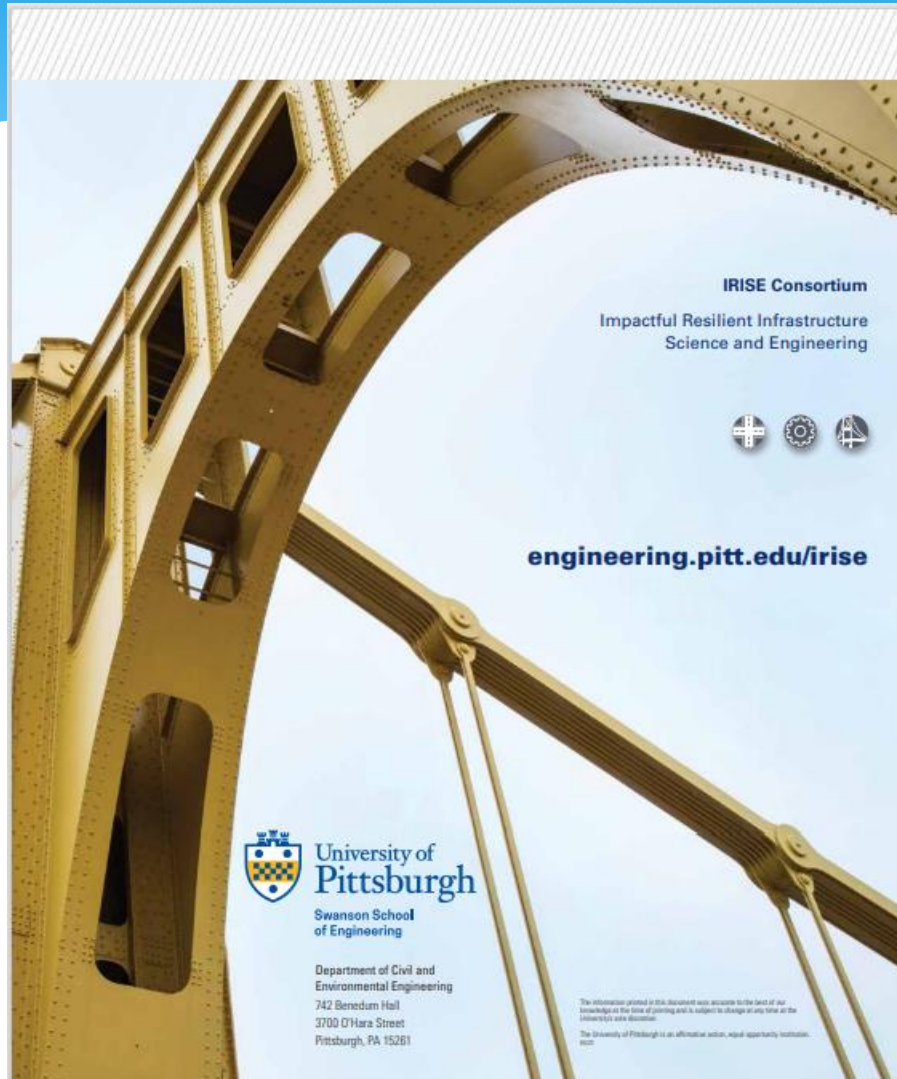
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80% Applied  
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**CURRENT = 14-28%**

# Questions



Additional details can be found at...



<https://www.engineering.pitt.edu/Irise/>  
Or Google "Pitt IRISE"

**Thank you for all your contributions  
this past year!**