




INNOVATIVE SOLUTIONS TO COMPLEX PROBLEMS

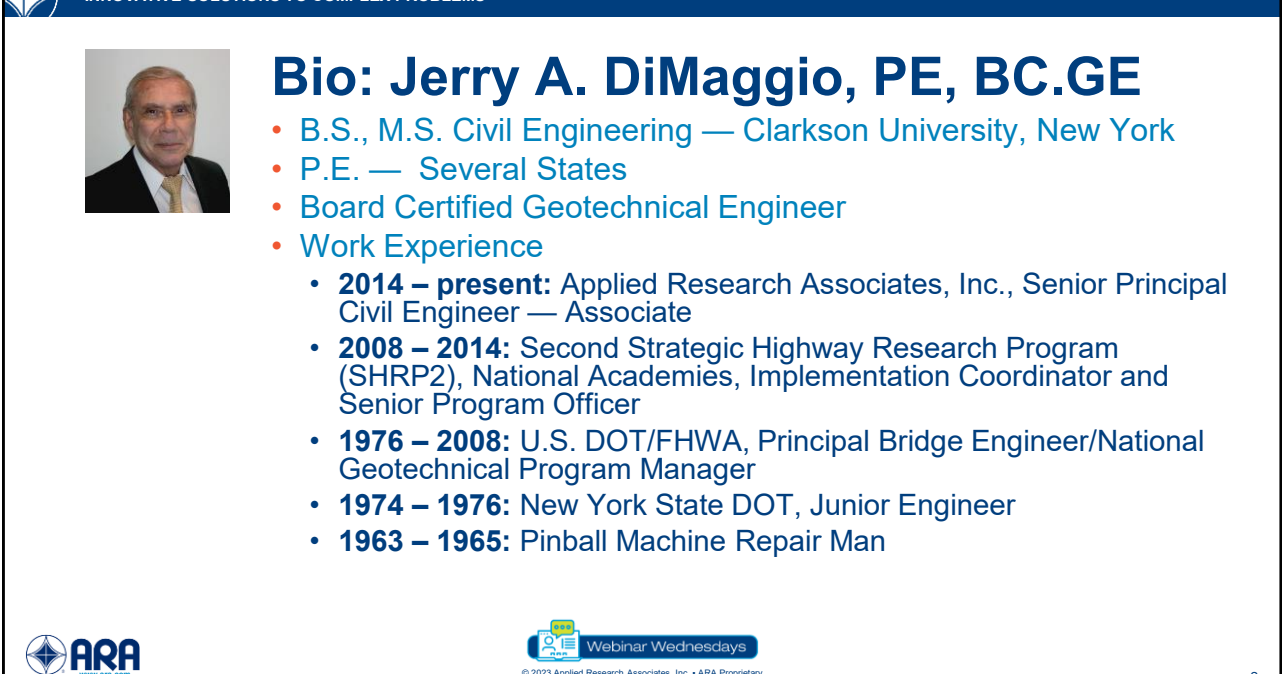
**Jerry A. DiMaggio, P.E., BC.GE**  
 52<sup>ND</sup> STGEC – CHARLOTTE, NC  
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# Sharing What I learned in 51 years of Practice!


Webinar Wednesdays



1




INNOVATIVE SOLUTIONS TO COMPLEX PROBLEMS



## Bio: Jerry A. DiMaggio, PE, BC.GE

- B.S., M.S. Civil Engineering — Clarkson University, New York
- P.E. — Several States
- Board Certified Geotechnical Engineer
- Work Experience
  - **2014 – present:** Applied Research Associates, Inc., Senior Principal Civil Engineer — Associate
  - **2008 – 2014:** Second Strategic Highway Research Program (SHRP2), National Academies, Implementation Coordinator and Senior Program Officer
  - **1976 – 2008:** U.S. DOT/FHWA, Principal Bridge Engineer/National Geotechnical Program Manager
  - **1974 – 1976:** New York State DOT, Junior Engineer
  - **1963 – 1965:** Pinball Machine Repair Man

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2

1



## Presentation Topics: Great topics suggested by our conference host

- **What are the biggest challenges for the Geo-community moving forward (5–10-year window)?**
- **Where does the Geo-community need research and innovation deployment?**
- **What can/should Transportation Agencies do better (big picture and/or geotechnical units)?**
- **What should we gain from this conference (yourself and other attendees)?**



3

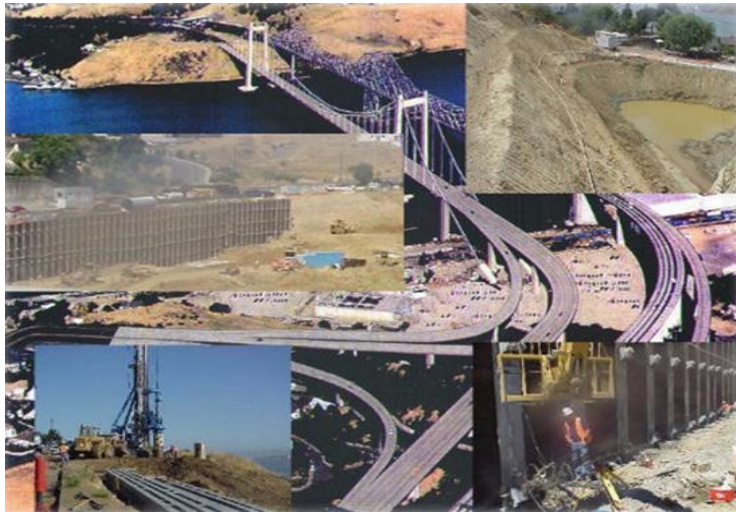


## FIRST A BRIEF REFLECTION: 51 years of development with a bit of critical opinion.

- **Subsurface Characterization:** Come a long way from drilling holes and squashing samples to data storage, data analysis, selection of parameters, new lab and field tests. **Opinion**
- **Slope Stability:** From hand computations to very sophisticated computer software and FE analysis tools. **Opinion**
- **Design and Analysis:** From almost 100% empirical designs to highly theoretical and strongly validated designs. **Opinion**
- **Construction Equipment:** WOW; truly amazing. **Opinion**
- **Load Testing:** From NEVER to routine and in most cases intelligently applied. **Opinion**
- **Deep Foundations:** From H-piles to TOO many choices and very large. **Opinion**
- **Ground Improvement:** Rarely considered and few choices to many choices. **Opinion**
- **Instrumentation:** Rarely used, crude devices to WOW. **Opinion**
- **Design and Service Life of Geo-features:** From rarely considered to GAM. **Opinion**
- **Interdisciplinary collaboration:** Very rare to now a MUST. **Opinion**
- **Soil and Rock Mechanics:** It hasn't changed. **Opinion**



4



5



## What are the biggest challenges for the Geo-community moving forward (5–10-year window)? (1/2)

- Remain relevant on all types, sizes, and complexity of projects & programs (examples)
- Renewed FOCUS on the basics of soil and rock mechanics, geology and traditional geotechnical engineering analysis (examples)
- Attracting and Retaining “talented” young and mid-level engineers to become civil engineering **Professionals** in general and geotechnical specialists specifically (examples)
- Return to a holistic approach to geotechnical engineering (explorations, laboratory/field testing, design/analysis, construction monitoring) (examples)
- Surface and groundwater assessment and application to analysis and design (examples)

6



## Match the First United States Code Dates

### DATE

- 1625
- 2008
- 1935
- 1987
- 1994
- 2020
- 1927
- 2000

### CODE EVENT

- First AASHTO Bridge Code
- First Building Codes in US
- First IBC Code
- First substantial Geo design content in AASHTO Bridge Code
- First AASHTO LRFD Bridge Code
- 9th Edition of AASHTO LRFD Code
- First Uniform Building Code
- Date LRFD Initially Mandated for new designs



7



## What are the biggest challenges for the Geo-community moving forward (5–10-year window)? (2/2)

- Meet final design, plans and specification performance requirements (examples)
- STOP talking to ourselves and become PART of the BIG picture (examples)
- Public Transportation Agencies MUST maintain an internal core team of technical expertise (examples)
- Understand that a majority of critical surface transportation issues require a significant geotechnical involvement
- Relearn compaction theory and related laboratory and field applications (examples)
- Be prepared to “reinvent and expand” your interests, skills and knowledge every 5-7 years (examples)
- Become leaders on interdisciplinary programs and issues (examples)
- DO NOT apply what you DON'T fully understand! Limitations, boundary conditions and knowing sources are imperative (examples)
- Improve our communication and selling SKILLS (examples)



8



## Where does the Geo-community need research / innovation deployment?

- **Mainstream** use of practical cost-effective innovations
- Deterioration and remaining service life models based on REAL performance
- Practical long-term monitoring of pertinent geo-feature conditions
- Improved reliability of deformation predictions and relevant application to transportation features
- Cost EFFECTIVE application of resilience and climate change considerations to geotechnical feature design and construction
- Processes to define short and long-term performance criteria for specific geotechnical features
- Develop and apply ROI and life cycle cost models to geotechnical features



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9

9



## Island of Forgotten Innovations



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10

10

INNOVATIVE SOLUTIONS TO COMPLEX PROBLEMS

Barrier

Geotextile Joint Material

Bearing Pad

Facing

Leveling Pad

Impermeable Membrane

Reinforcement

Reinforced Backfill

Roadway Drainage

Retained fill

Porous Fill

Wall Drainage

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11

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## What can/should Transportation Agencies do better (big picture and/or geotechnical units)? (1/2)

- Improve effective communication with internal and external stakeholders (both written and oral) (Geo)
- Define and consistently apply Acceptance and Rejection of constructed features; explicitly! (Geo)
- Proactive Documentation of Data and Observations during construction (Agency)
- Effective mitigation against project and program risks (BEGIN BY GETTING INVOLVED with Agency Risk Management Programs (Geo)

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12





## Myths About Selling Among Technical Specialists

- Selling is unprofessional
- No one likes a salesperson
- Only extroverts can sell
- Scientists & engineers shouldn't have to sell
- You are either born a salesperson or not



13



## What can/should Transportation Agencies do better (big picture and/or geotechnical units)? (2/2)

- Develop an in-depth understanding of loads and load combinations (Geo)
- Learn how to prepare better specifications in particular material and installed acceptance criteria (Agency)
- Improve knowledge of risk management; NOT ONLY Risk Registers (Geo)
- Understand and apply lifecycle cost analysis and ROI (Agency)

14



15

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## What should we gain from this conference (yourself and other attendees)?

- Networking and select follow-up communications with new colleagues and clients
- Learn about a NEW product, materials or processes which are NEW to YOU, and YOU can apply to your practice
- Take a deep dive with exhibitors (You will learn a lot)
- Compliment and encourage younger presenters
- Practice your “selling” skills and messaging; Learn the art of being a GOOD LISTENER
- Practice the skill of “Selling Company” services beyond your area of expertise

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16

16





## Tips For Engaging in Effective Conversations Conferences & Association Events

- Other Practical Tips
  - Name tag on left
  - Drink in left hand
  - Smile & be positive
- Seek high traffic areas
- Ending conversation smoothly
- Breaking into a “circle”
- Seek a follow-up contact



## Sharing What I learned in 51 years of Practice!

# Q&A

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