Day 3 Lunch Program
Technology as an Opportunity

Center for the Remediation of Complex Sites (RemPlex)

2023 Global Summit on Environmental Remediation

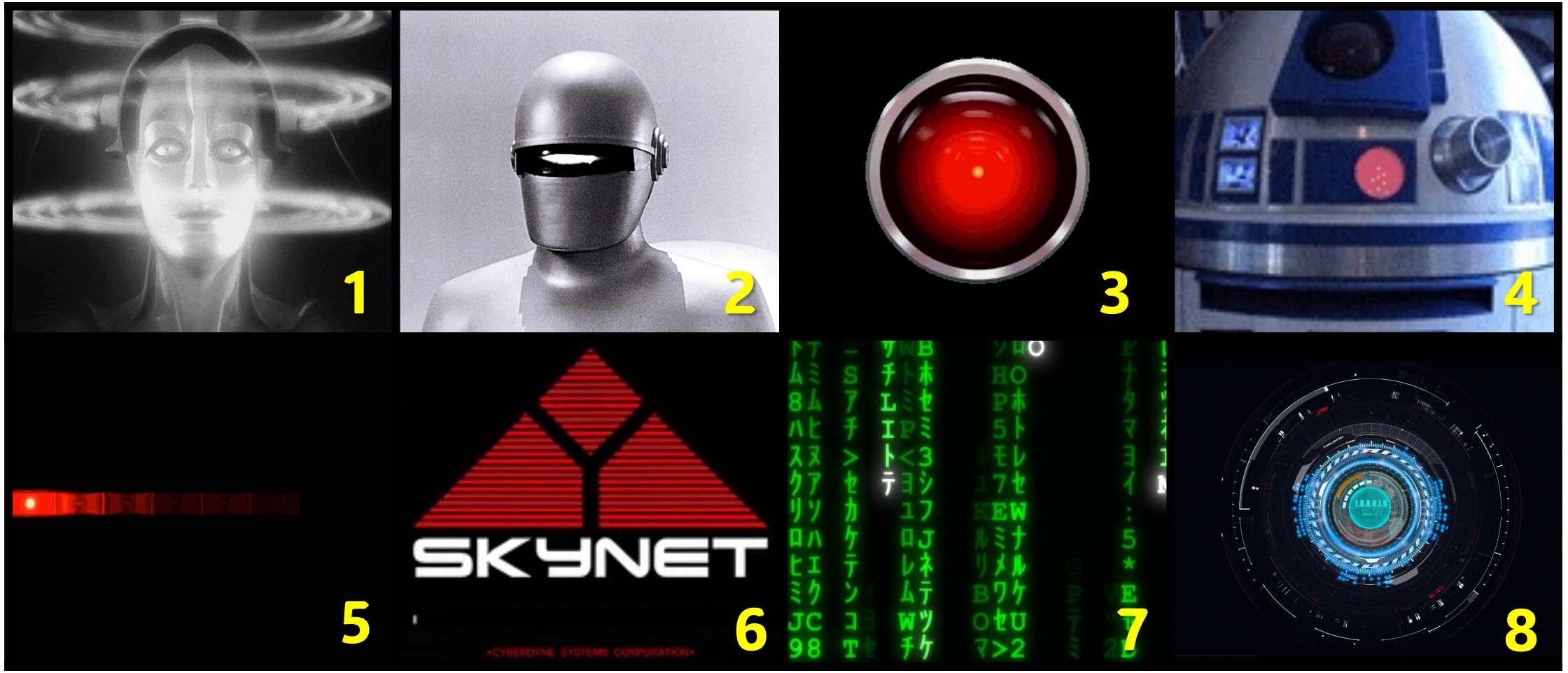
November 13 – 17, 2023

Agenda

- Mission Status
- Technology Development: EM Portfolio
- Workforce Development: University Partnerships
- Implications to Cleanup Mission

REMPLEX
CENTER FOR THE REMEDIATION OF COMPLEX SITES
@PNNL

Which would be considered AI?



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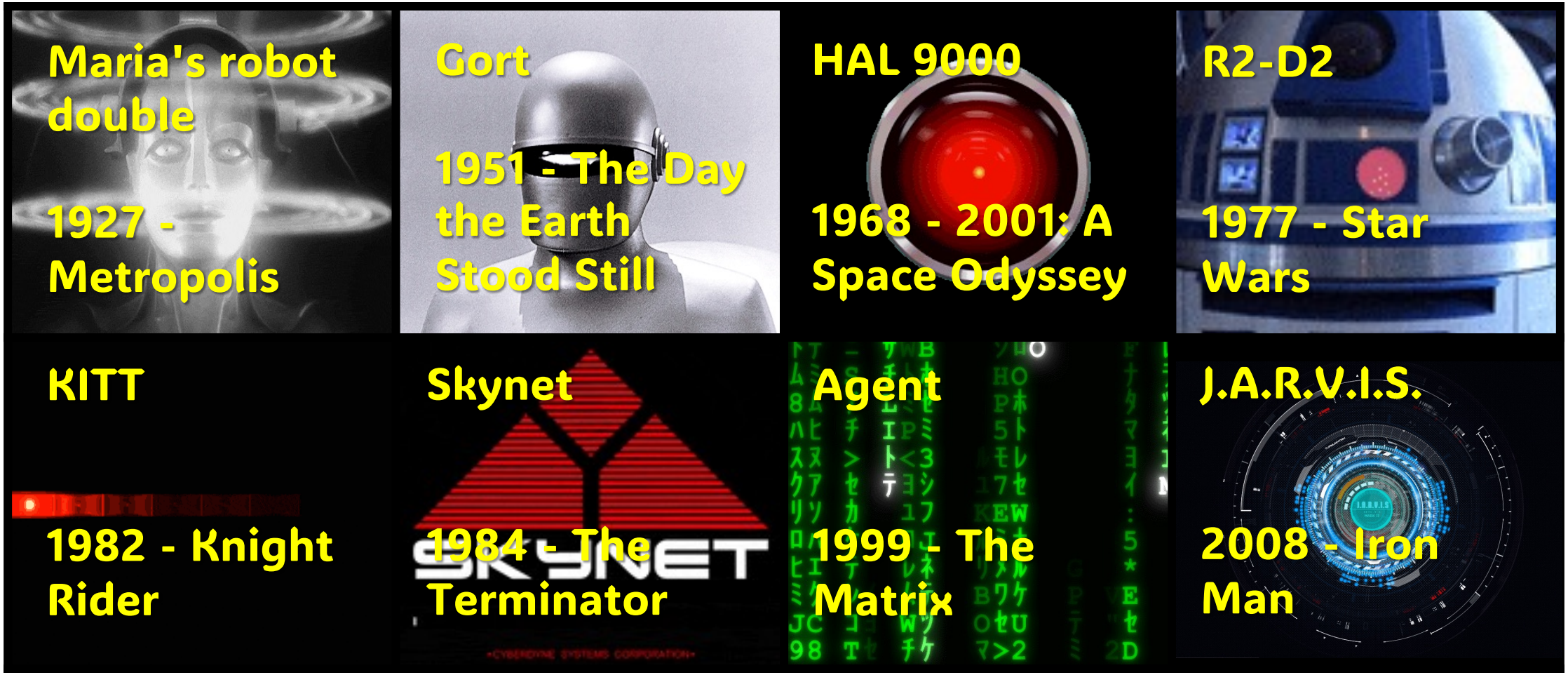


Mission Outlook

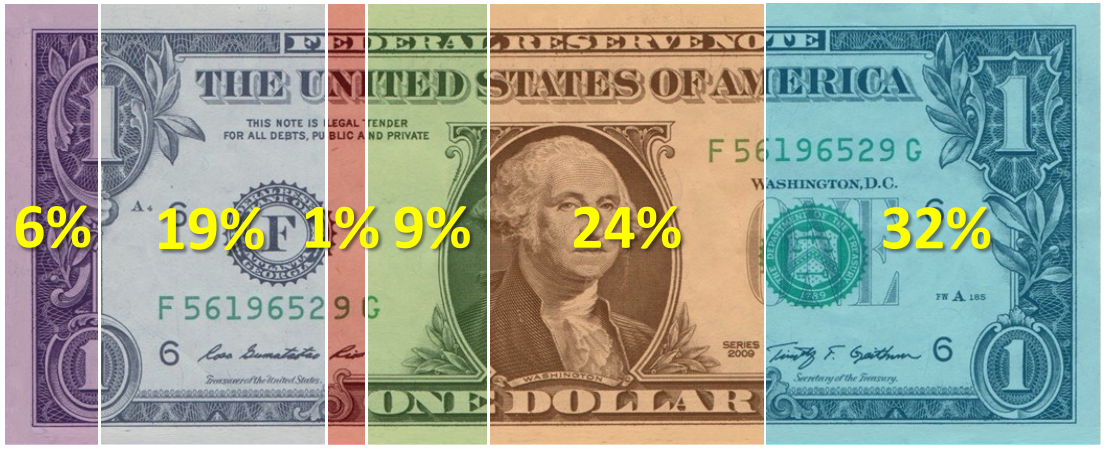
- Legacy Cleanup
  - 92 sites completed
  - 15 sites to go

- Completion Estimates
  - Mission: 2078 – 2091
    - $488,504M - $723,332M
  - SNF: 2040
  - SNM: 2060
  - Tank Waste: 2065
  - D&D: 2086
  - Soil & Water: 2091
  - Solid Waste: 2091

Current Budgets

FY2023 Enacted Budget: $8,263M

- SNF/SNM: $580M
- Tank Waste: $2,874M
- TRU, SW: $1,033M
- D&D: $1,755M
- Soil, GW: $511M
- Site Services: $1,510M

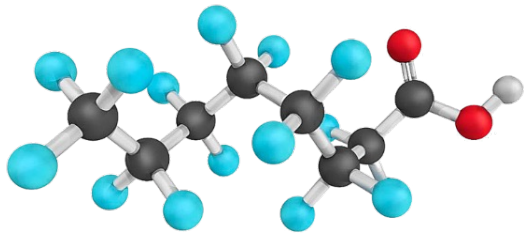
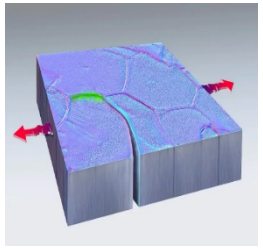


FY2023 TD Portfolio: $68.55M

- SNF/SNM: $7.40M
- Tank Waste: $12.47M
- TRU, SW: $0.83M
- D&D: $5.78M
- Soil, GW: $15.48M
- Enablers: $21.02M

Technology Maturation

Technology Readiness Level Scale								
1	2	3	4	5	6	7	8	9
Discover		**Design**		**Demonstrate**			**Deploy**	
Observe and report **basic principle**.	Formulate technology concept and application.	Experiment, test, and analyze **proof of concept** or key function, behaviors, or reactions.	Validate in a **laboratory environment**.	Validate **50% design model** in a relevant or **representative environment**.	Demonstrate **75% design model** or prototype in a relevant or **representative environment**.	Demonstrate **90% design solution** in an **operational environment**.	Technological **solution completed**, functionally proven, and **operationally qualified**.	Technological **solution proven** through successful **mission operations**.




Discovery and Technology Design

Technology Readiness Level Scale								
1	2	3	4	5	6	7	8	9
Discover		**Design**		**Demonstrate**			**Deploy**	
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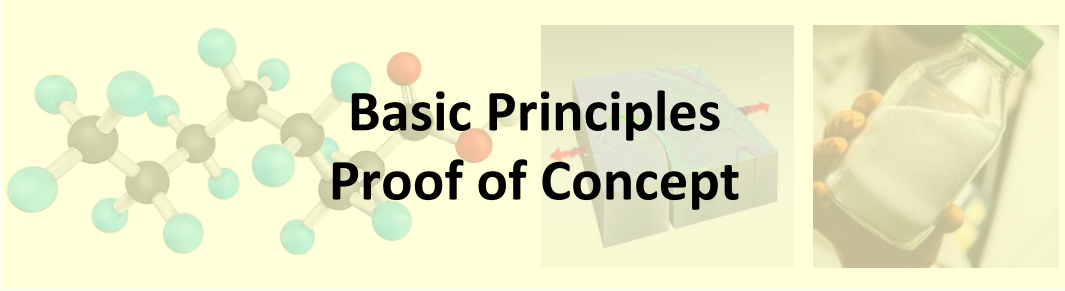

Technology Demonstration

Technology Readiness Level Scale								
1	2	3	4	5	6	7	8	9
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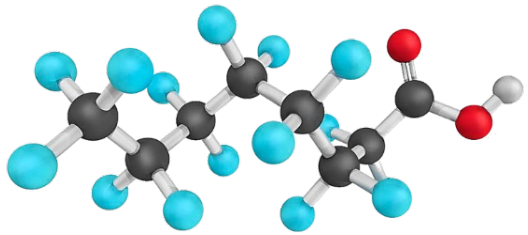
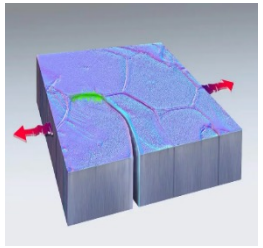
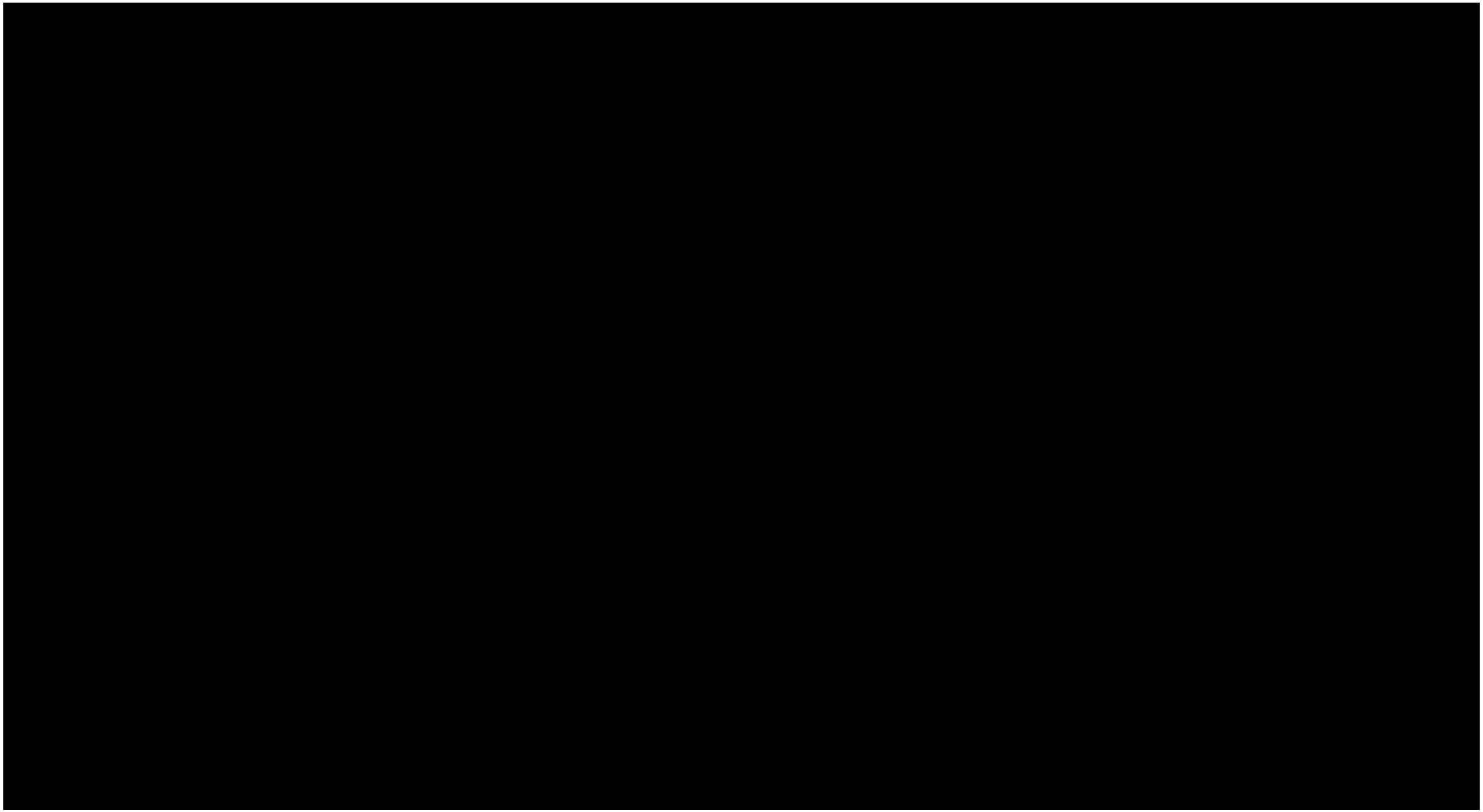




Testing & Evaluation
Verification & Validation
Safety, Security & Ops Basis



Technology Deployment

Technology Readiness Level Scale								
1	2	3	4	5	6	7	8	9
Discover		Design		Demonstrate			Deploy	
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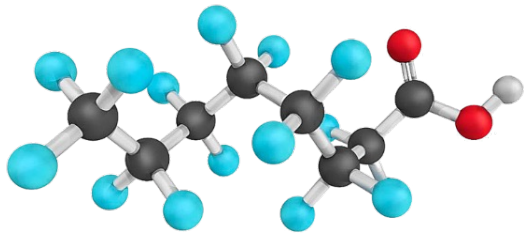
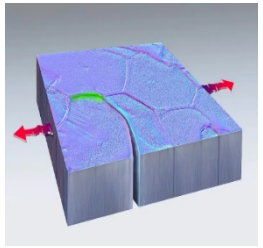
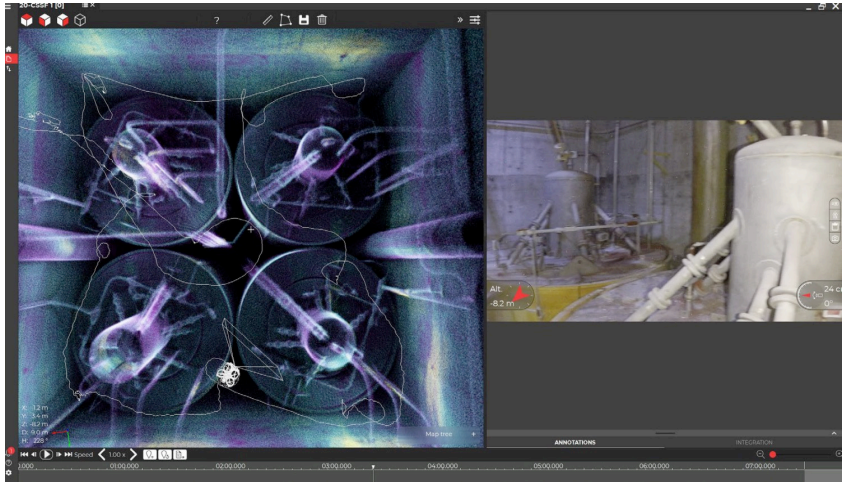
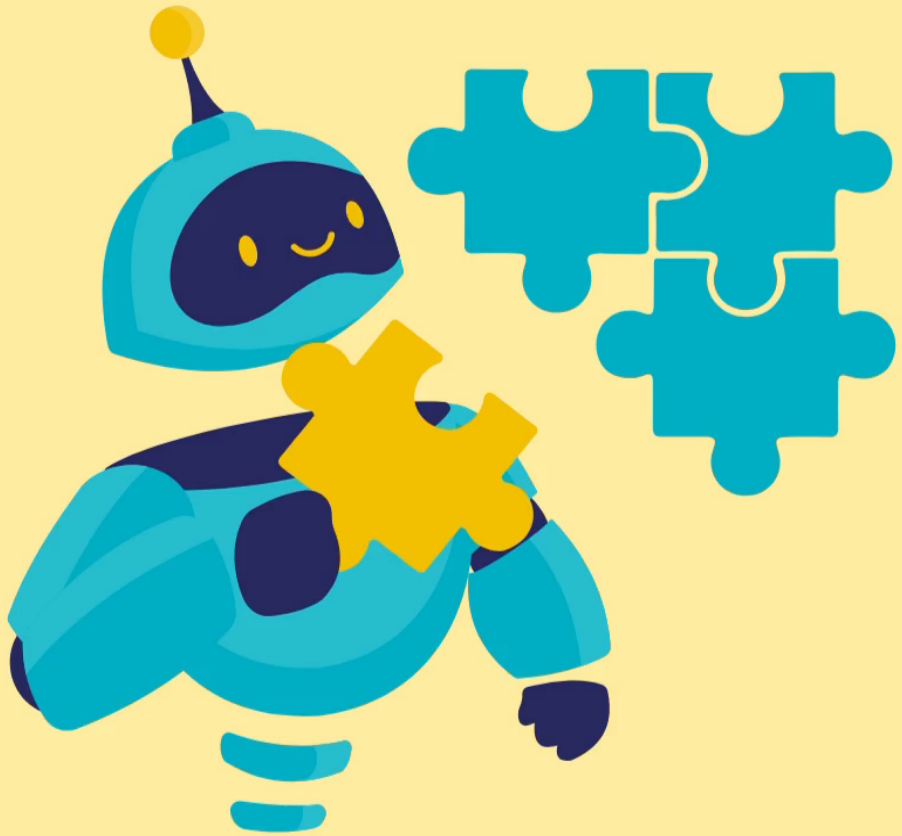






Recent Deployments





Robotics on EM's Cleanup Mission

Current Technology Portfolio

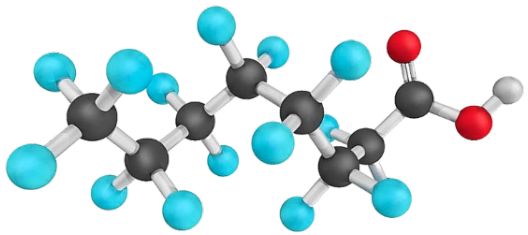
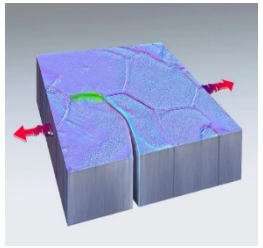
Technology Readiness Level Scale								
1	2	3	4	5	6	7	8	9
Discover		Design		Demonstrate			Deploy	

Profile of Current Technology Projects

42 Projects (40%)	60 Projects (57%)	4 Projects (3%)
$15,150K (22%)	$50,090K (73%)	$3,310K (5%)

Distribution of Lead Principal Investigators

National Labs: 10 Projects (9%) Universities: 32 Projects (30%)	National Labs: 55 Projects (52%) Universities: 5 Projects (5%)	National Labs: 3 (3%) University: 1 (1%)




Collaboration

DOE PSOs

Institutes of Higher Education

Community of Practice

EM Primes

Other Federal Agencies

Research & Technology Institutes

DOE National Labs

International Partners

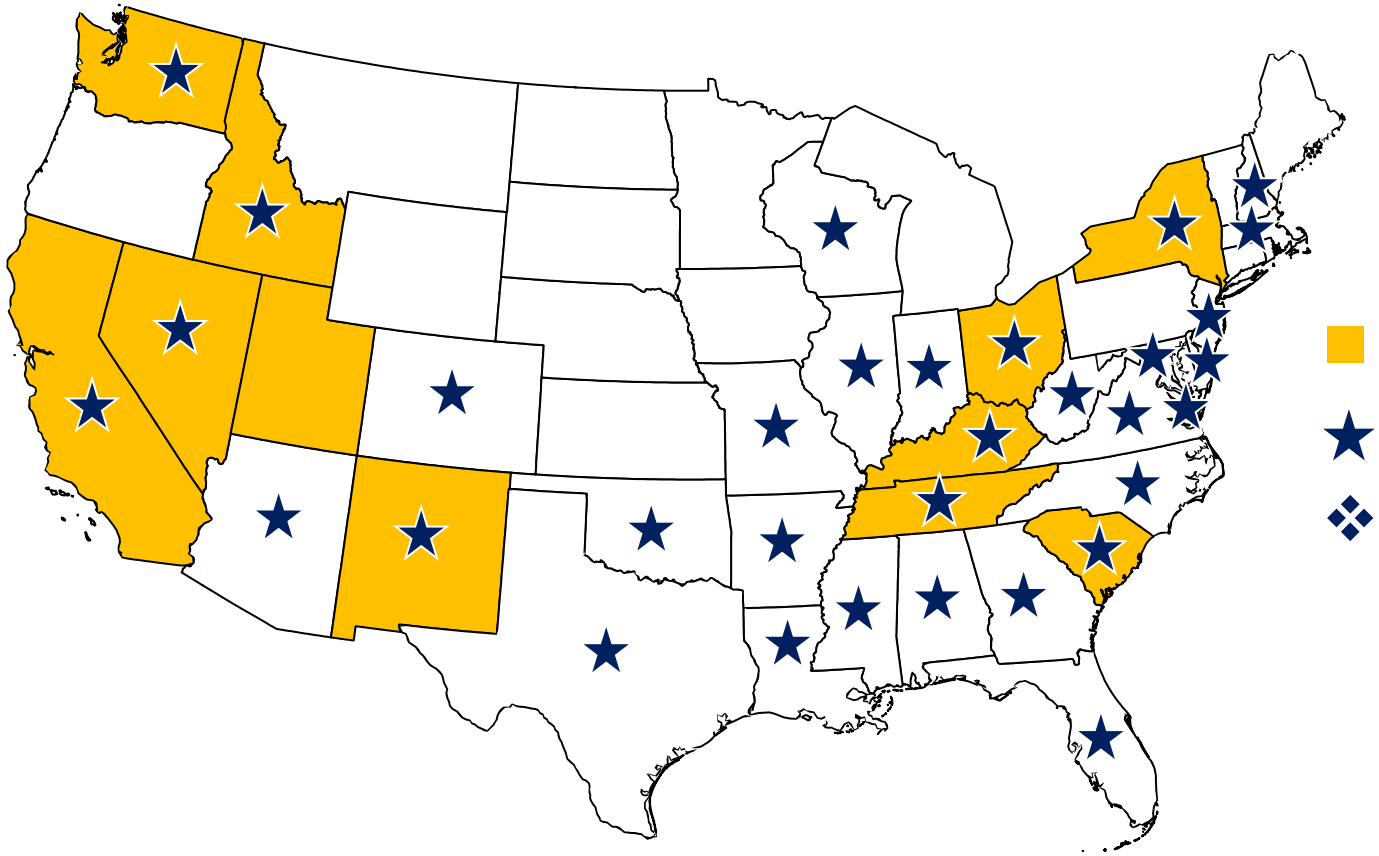
Technology Supply Chain

Other External Techies

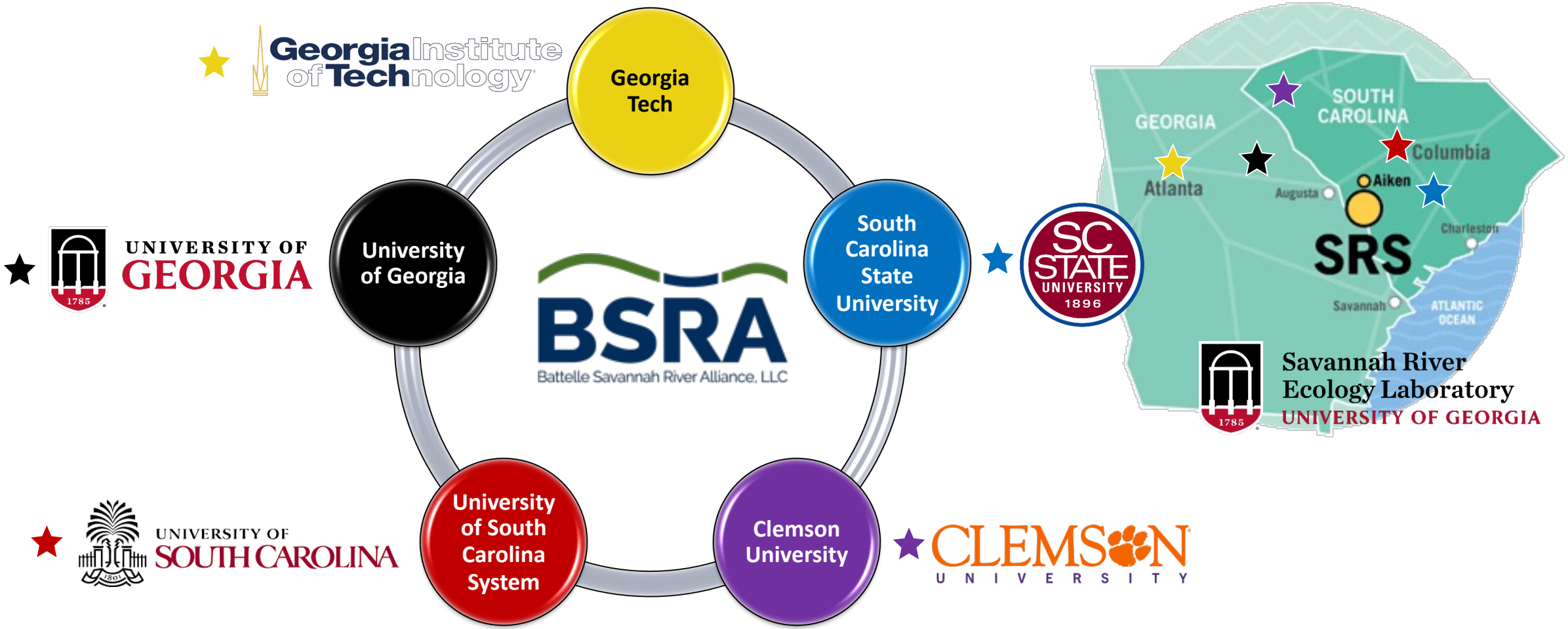
Other FFRDCs

Professional Societies

Engaging Institutes of Higher Education



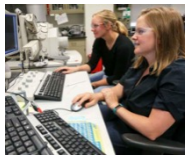
- Cleanup at 11 States
- ★ IHEs in 35 States
- ❖ > 100 IHEs
  - ♦ > 75 MSIs
    - > 1,600 students
    - > 100 faculty, staff

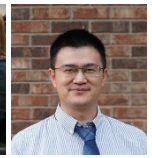

Georgia Institute of Technology
Georgia Tech
University of Georgia
South Carolina State University
BSRA
Battelle Savannah River Alliance, LLC
University of South Carolina System
Clemson University
UNIVERSITY OF GEORGIA
SC STATE UNIVERSITY 1896
UNIVERSITY OF SOUTH CAROLINA
CLEMSON UNIVERSITY
GEORGIA
SOUTH CAROLINA
Atlanta
Augusta
Aiken
Columbia
Charleston
SRS
Savannah
ATLANTIC OCEAN
Savannah River Ecology Laboratory
UNIVERSITY OF GEORGIA

Early Partnerships

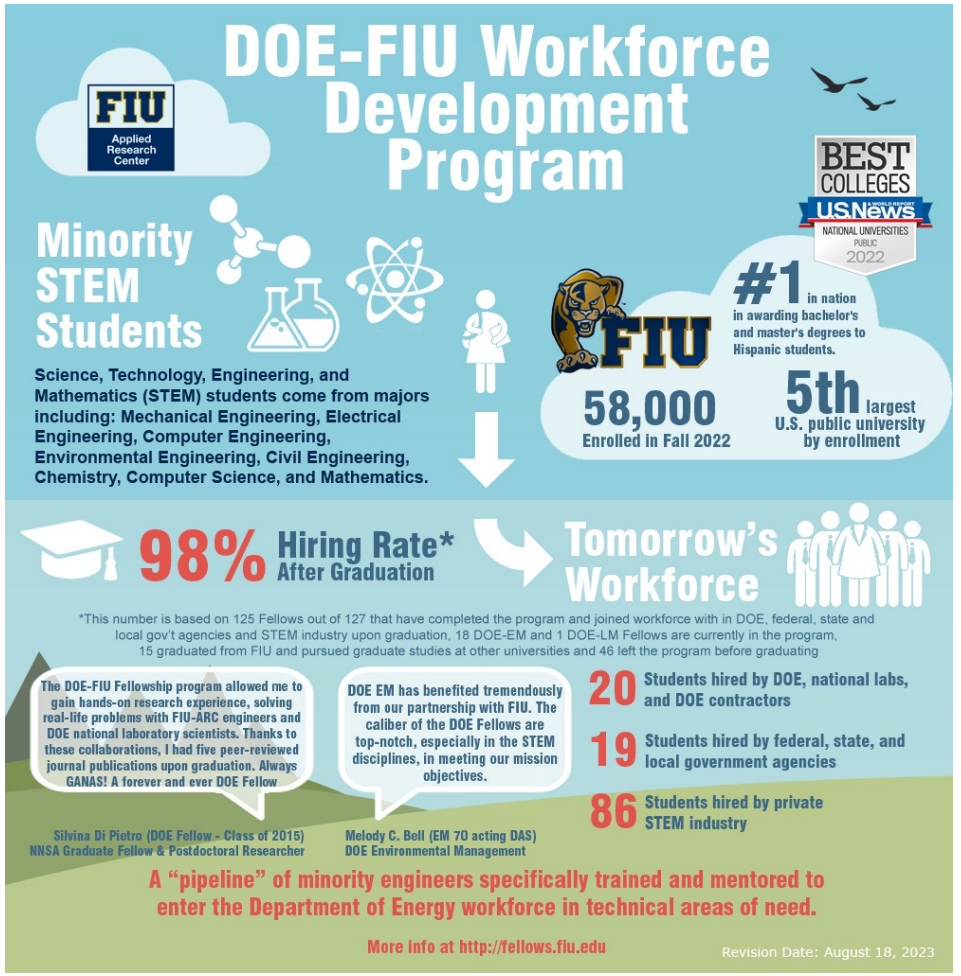
MISSISSIPPI STATE UNIVERSITY™
INSTITUTE FOR CLEAN ENERGY TECHNOLOGY

VANDERBILT UNIVERSITY





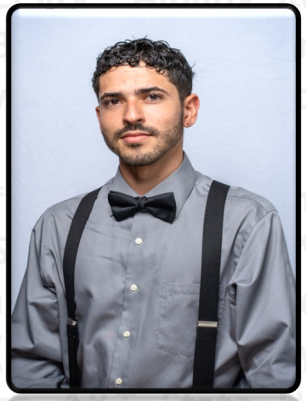
CRESP
CONSORTIUM FOR RISK EVALUATION WITH STAKEHOLDER PARTICIPATION



MSI Partnerships

- Competitive Research Awards
- Technology, Curriculum and Professional Development Grants
- Shared Interest Research Partnerships Grants
- Savannah River Environmental Sciences Field Station
- Internships
- Graduate Fellowship
- Postdoctoral Research

Recent Good News



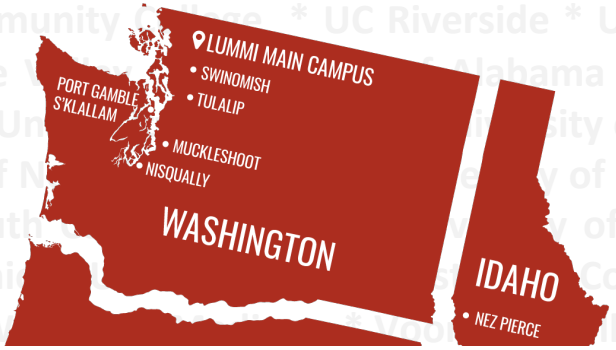
Axwel Deliz Arroyo
IU PR → SRESFS

Olivia Bustillo
FIU → UCOR

Silvina Di Pietro
FIU → LLNL

Josue Estrada
FIU → WRPS

Phuong Pham
FIU → SRNL



Looking Forward

- **Industrial Revolutions**
  - 1st (1765): Coal, steam, mechanization
  - 2nd (1870): Electricity, steel, chemical synthesis, comms, mass production
  - 3rd (1969): Fission, electronics, telecommunications, computers
  - 4th (2000): Renewables, IoT, big data, human-machine interaction, AI/ML, automation/robotics
  - *5th (2030): Fusion, sustainability, human-centeredness, deep space*
  - *6th (2060) and 7th (2090): ?*

- **Workforce Generations**
  - 1946 – 1964: Baby Boomers
  - 1965 – 1980: Generation X
  - 1981 – 1996: Millennials (Gen. Y)
  - 1997 – 2012: Generation Z
  - *2013 – 2028: Generation A*
  - *2029 – 2044: Generation B*
  - *2045 – 2060: Generation Γ*
  - *2061 – 2076: Generation Δ*
  - *2077 – 2092: Generation E*

Final Thoughts

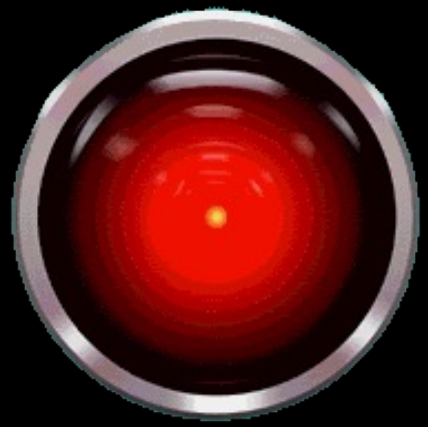
❖ Technology & Innovation

- ♦ Exploit scientific discoveries
- ♦ Keep pace with technological advancements and the future-of-the-art
- ♦ Facilitate and embrace new concepts, advanced tools, complimentary capabilities, and baseline alternatives

❖ Workforce & Workplace

- ♦ Technology as an elixir
- ♦ Generational succession and workforce planning
- ♦ Become the “greener grass”

I’m sorry RemPlex.
I’m afraid this talk
has just been
terminated.



2001: A Space Odyssey

HAL 9000 (Heuristically programmed ALgorithmic computer)

thanks

director, acting
em office of technology development

rodrigo.rimando@em.doe.gov