



*William E. Schnabel, PhD, PE*

*Dean, UAF College of Engineering and Mines*

# UAF's Higher-Ed Manifold: Energizing Alaska's Industrial Workforce



*Kevin Alexander, Prof., A&P*

*Dean, UAF Community and Technical College*



**TOP 1%**

~ 24 U.S. Institutions hold the Land, Sea, Space triple designation.

National Center Education Statistics (NCES) report 2021

**Triple Crown Status**



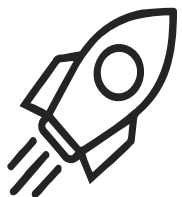
## Land Grant

Applied research and extension for communities and industry



## Sea Grant

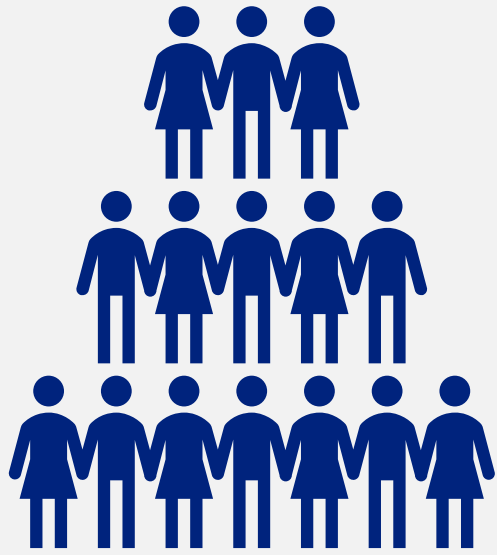
Coastal and marine research, education, and advisory services



## Space Grant

Aerospace + STEM workforce and research partnerships





**Alaska's  
Technical  
Workforce**



**Student  
Pool**





Sector A / Level X



Sector A / Level Y

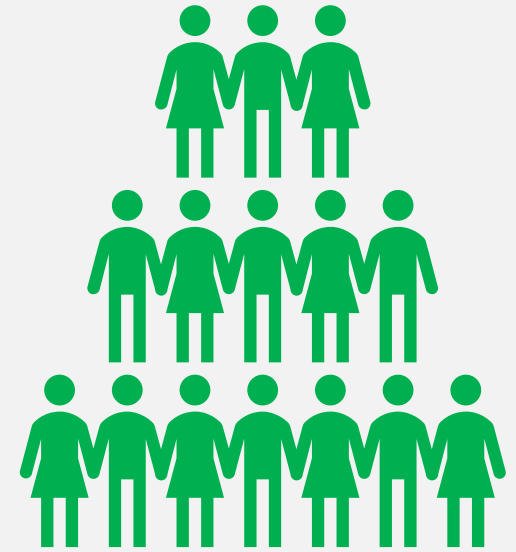


Sector B / Level X



Sector B / Level Y

**Workforce  
Needs**



**Student  
Pool**





Sector A / Level X



Sector A / Level Y



Sector B / Level X



Sector B / Level Y

**Workforce  
Needs**

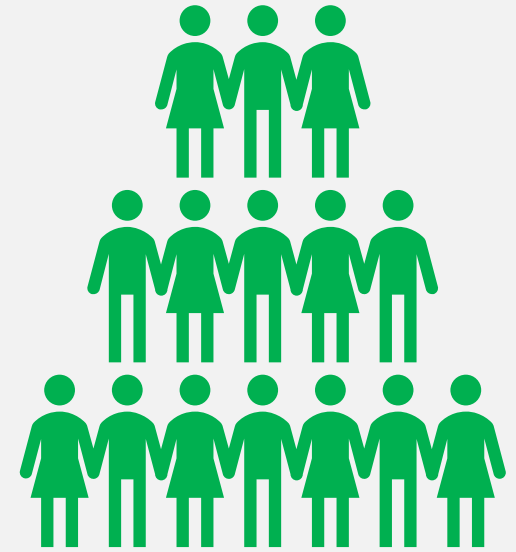


Sector A+B / Level X



Sector A+B / Level Y

**UAF**



**Student  
Pool**





Sector A / Level X



Sector A / Level Y



Sector B / Level X



Sector B / Level Y

**Workforce  
Needs**

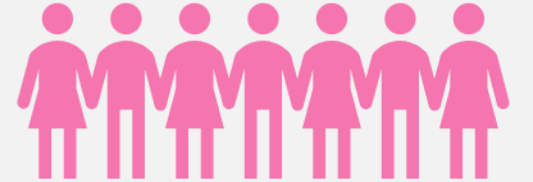
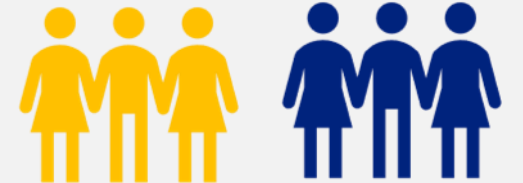
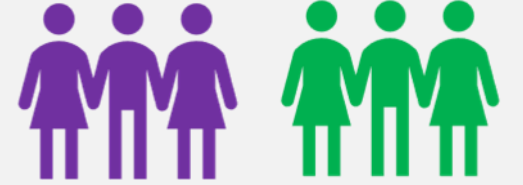


Sector A+B / Level X



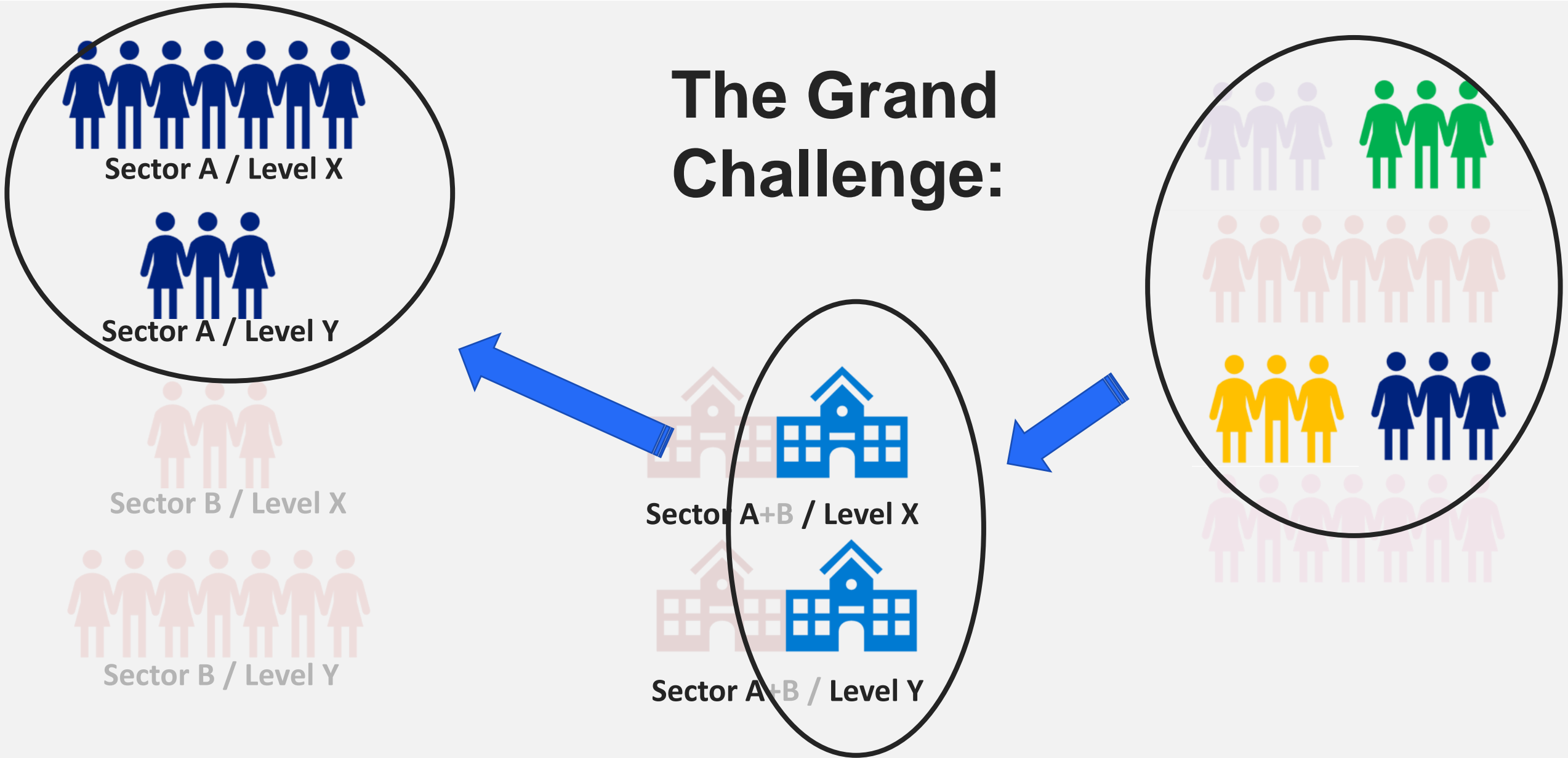
Sector A+B / Level Y

**UAF**



**Student  
Interests**

# The Grand Challenge:



**Align Workforce Needs + Educational Offerings + Student Interests**

# Alaska's Skills ~~Pipeline~~ Manifold

**CTC + CEM is the State's Stackable-Credential Workforce Engine**



## **Occupational Endorsements and Certificates**

Entry or upskilling. Weeks to 1 year (6-30 credits)

Ex. Facilities Maintenance, UAV Operations, Welding, Mining & Mill Ops, Instrumentation & Automation, FAA A&P



## **A.A.S. / A.S.** Technical Degrees. 2 years

Ex. Aviation Maintenance, Construction Management, Industrial Process Operator



## **B.S Engineering** ABET-accredited. 4 years.

Aerospace, Civil, Computer Science/ Engineering, Energy Resource, Electrical, Mechanical, Mining, and Geological.



## **M.S. Engineering** 2+ years.

Advanced practice and research.

Aerospace, Civil, Computer Science/Engineering, Energy Resource, Electrical, Mechanical, Mining, and Geological.



## **Ph.D. Engineering** 4+ years.

R&D Innovation and Faculty Pipeline.

# Alaska is an Aviation state

## CTC Job Ready

- **Airframe & Powerplant certificates;** FAA Part 147 certified; can be completed in just 12 months.
- **Aviation Maintenance (A.A.S)**
- **Unmanned Aircraft Operations (O.E.)**

## CEM Engineering Systems

- **Aerospace, Electrical, Computer, Mechanical (B.S./M.S.)** Avionics, UAS, sensors, maintenance systems
- **Engineering Ph.D.** Arctic aviation R&D, autonomy, safety, materials



**Example Employers:**  
Local and National Airlines, Cargo Operators, Medevac, airports, UAS services, DoD/USCG Support.



Aviation  
Highlight:

DARPA Lift  
Challenge



# Transportation Highlight:

# Career Pathways and T3 Programs

# Build it for the Future

## CTC Job Ready

- **Construction Management (A.A.S)**
- **Drafting Technology (O.E.)**
- **Facilities Maintenance (O.E.)**
- **Apprenticeship Technology (A.A.S.)**

## CEM Engineering Systems

- **Civil, Electrical, Mechanical (B.S./M.S.)**  
Transportation, water, structural, geotechnical, airports/ports
- **Engineering Ph.D.** Arctic R&D, autonomy, permafrost, climate adaptation



**Example Employers**  
Heavy Civil Construction,  
Public Infrastructure /  
DOT&PF, U.S. Army  
Corps of Engineers,



Construction  
Highlight:

Automated  
Construction  
& Advanced  
Materials Lab

# Energy Workforce

## CTC Job Ready

- **Industrial Process Operator (A.A.S)**
- **Instrumentation & Automation Technology (Cert)**
- **Welding Technology (O.E.)**

## CEM Engineering Systems

- **Energy Resource Engineering (B.S.) Petroleum Engineering (M.S.)** Drilling, reservoirs. Production optimization, power systems,
- **Engineering Ph.D.** Remediation and Compliance R&D



**Example Employers**  
Oil and gas producers,  
Energy Infrastructure,  
Electric Utilities,  
Emerging Energy



# Energy Sector Highlight:

# Process Technology & ConocoPhillips Partnership

# Critical Minerals Workforce

## CTC Job Ready

- **Mining & Mill Operations (O.E.)**
- **Mining and Petroleum Training Service (MAPTS)** Underground & Surface mining, MSHA, Rural Heavy Equipment Operator

- **Diesel / Heavy Equipment (Cert.)**

## CEM Engineering Systems

- **Mining, Geological (B.S./M.S.)** Arctic ground conditions, mine design, processing efficiency
- **Engineering Ph.D.** Innovative mineral extraction/processing



**Example Employers**  
Mine Operators,  
Mineral Development,  
Regional Companies



**Mining  
Highlight:**

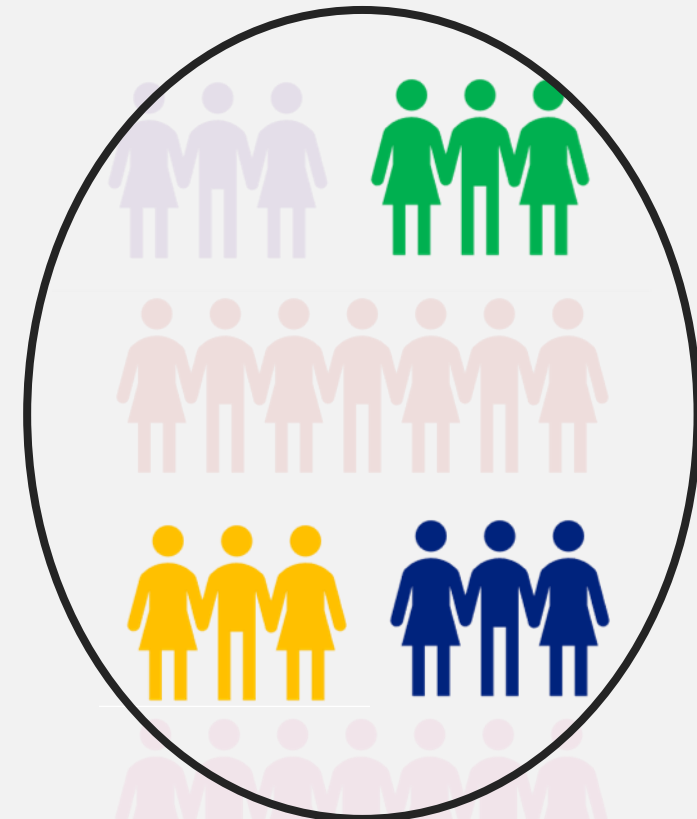
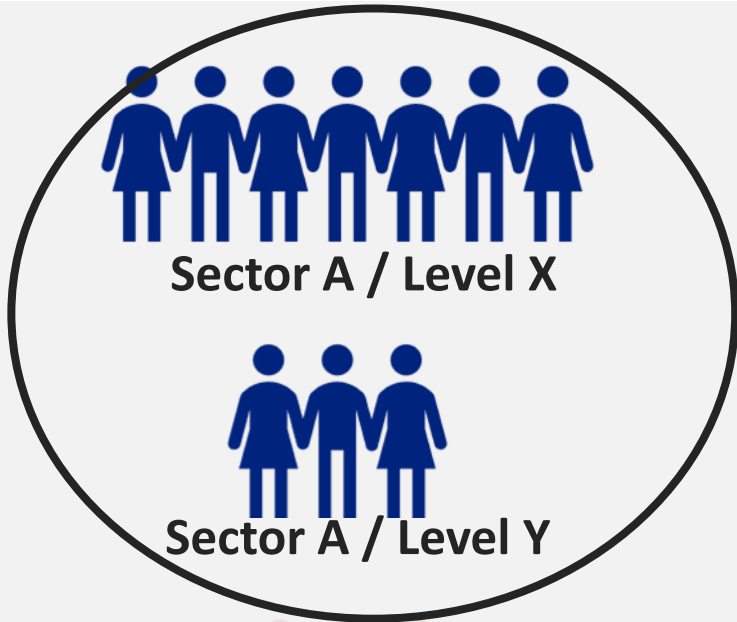
**MAPTS:  
Mining and  
Petroleum  
Training Service**



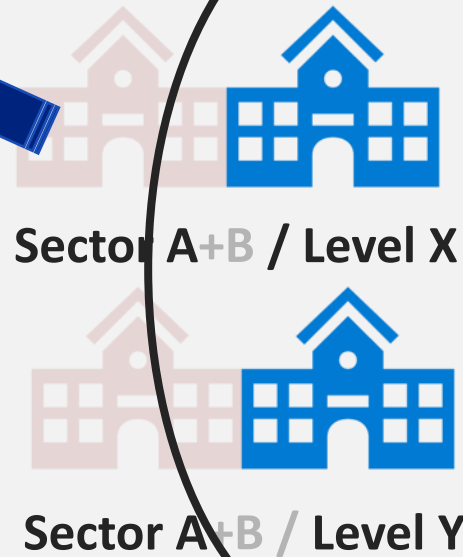
**Mining  
Highlight:**

**INE Critical  
Minerals  
Laboratory**

# The Approach:



**1) Understand workforce needs**



**3) Make it exciting**

**2) Tune the manifold**

Laborers, Operators,  
Technicians,  
Geoscientists, Miners,  
Mineral Processers,  
Innovators

## The Critical Minerals Approach:

T3, ARE & ANSEP  
outreach; Dual-  
credit HS  
programs; UA O.E.  
– Ph.D.

**1) Understand  
workforce  
needs**

ENGINES

+

R1

**3) Make it  
exciting**

**2) Tune the manifold**

**Thank you for your time.**



***William E. Schnabel, PhD, PE***

*Dean, UAF College of Engineering and Mines*



***Kevin Alexander, Prof., A&P***

*Dean, UAF Community and Technical College*

