

SEMI Works™

A systematic approach to align, develop, and advance a national skills-based talent pipeline

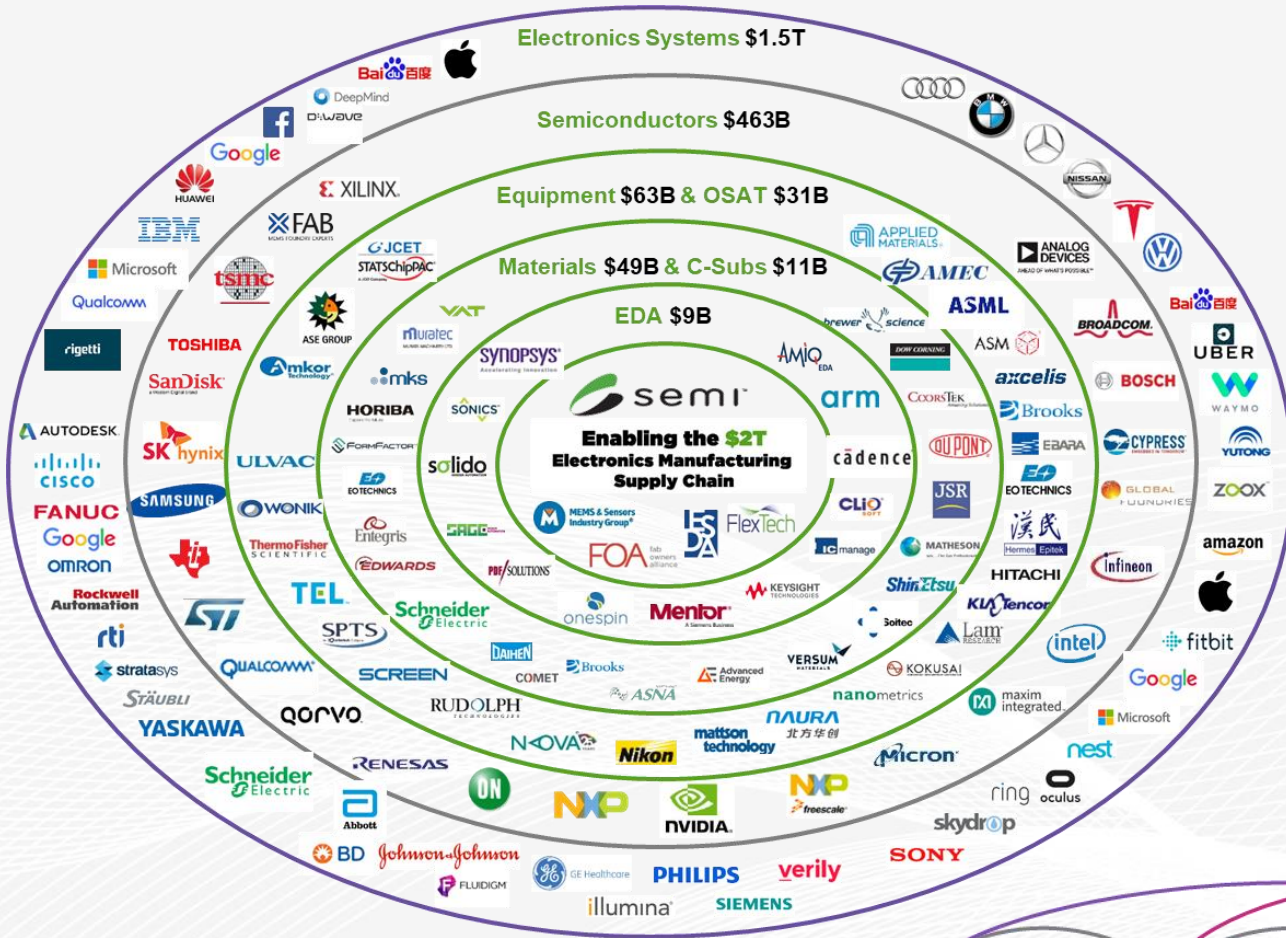
*MNT SIG Conference
July 28, 2020*



Connect ♦ Collaborate ♦ Innovate ♦ Grow ♦ Prosper

SEMI's Unique Positioning

Bridging the Complicated and Fragmented Microelectronics Supply Chain



R&D Consortia

Materials

Equipment

Manufacturing (Foundry, OSAT, EMS)

Semiconductor Devices, Sensors & Design

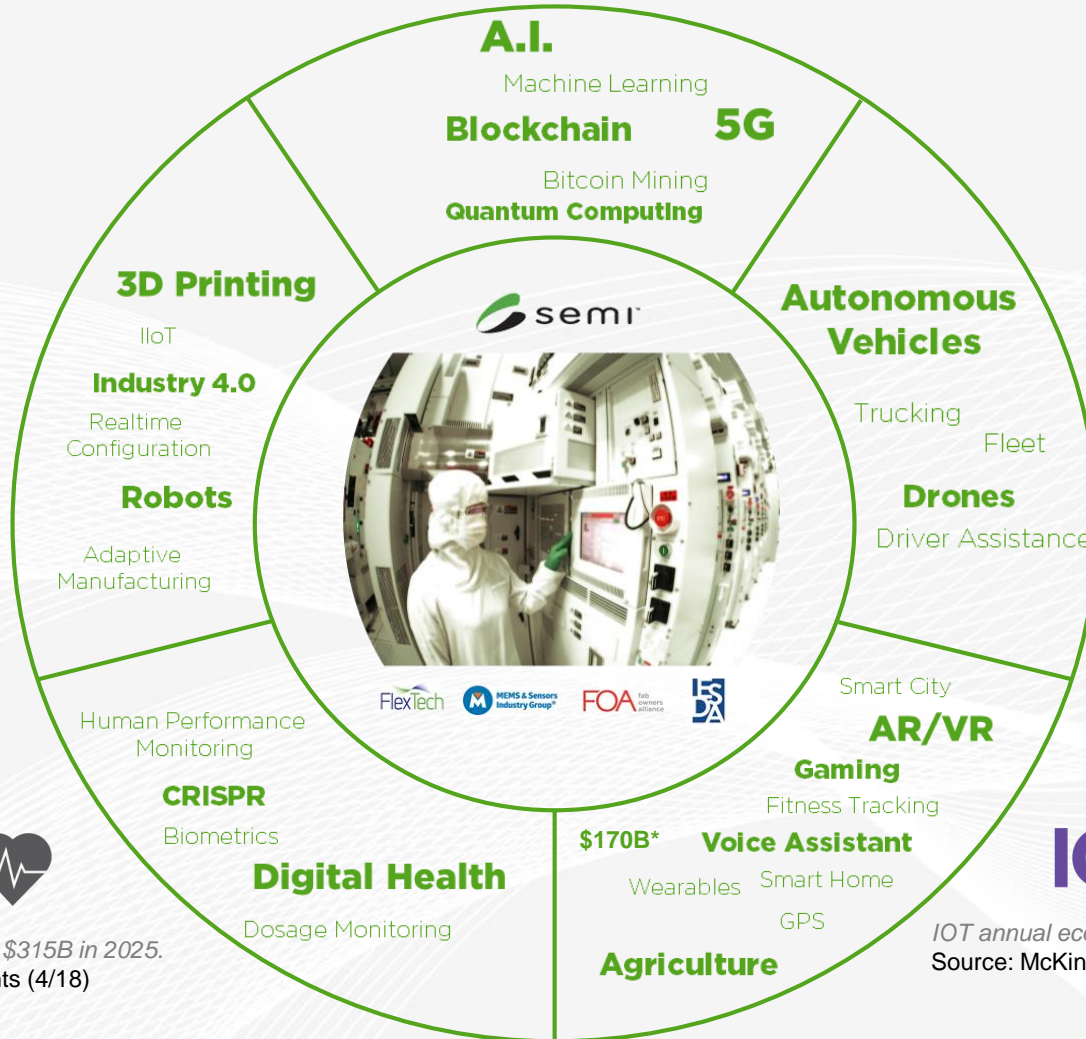
System Integration & OEM (Medical Equipment)

Application Market

SEMI Initiatives



AI direct revenue \$36B, enabled areas \$59B, in 2025.
Source: Grand View Research (6/17)



Industrial IoT work \$834B in 2025
Source: Grand View Research (4/17)



ADAS market worth \$67.4B by 2025. Source:
Grand View Research (2/18)



Wireless health market worth \$315B in 2025.
Source: Global Market Insights (4/18)



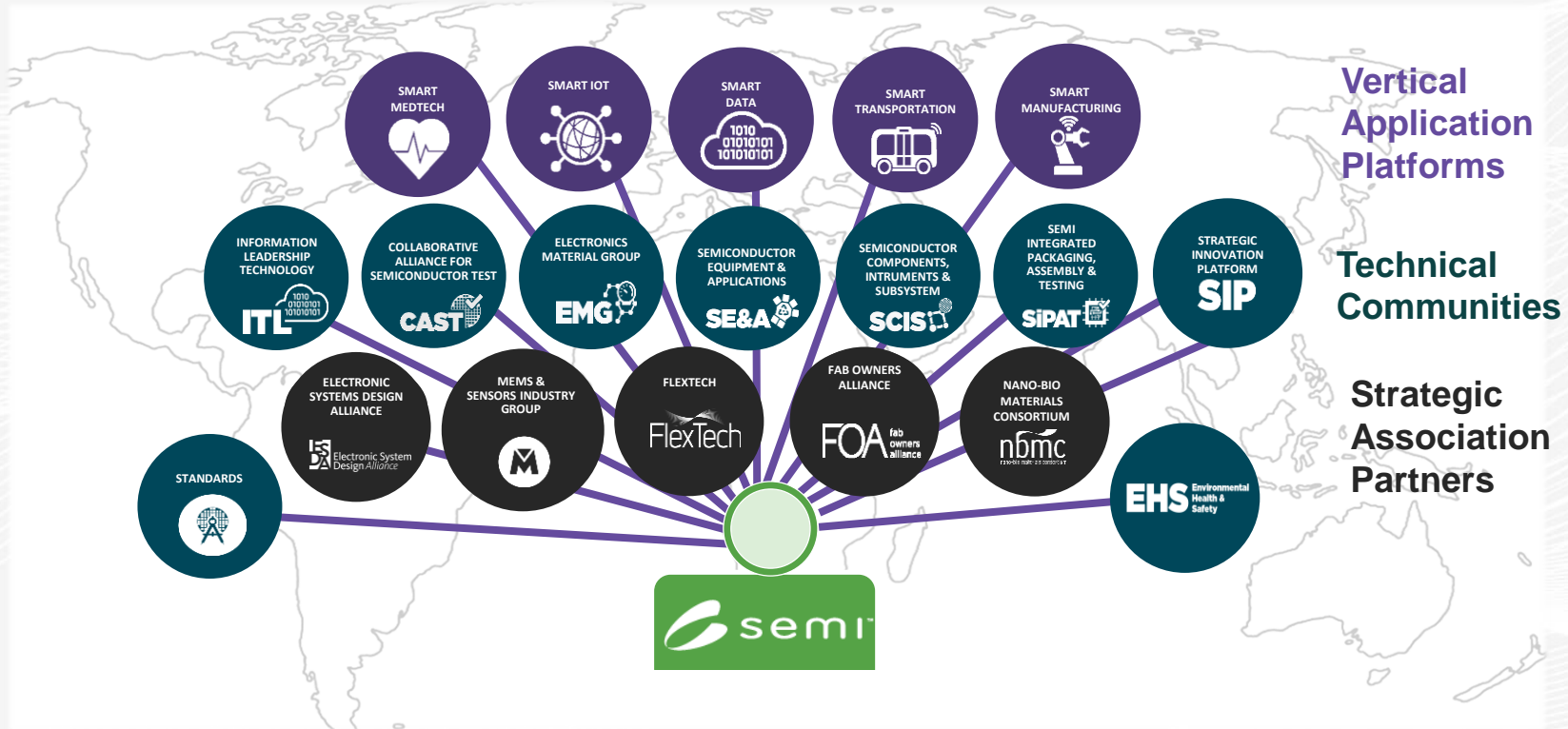
IOT annual economic impact of \$3.9T to \$11.1T by 2025.
Source: McKinsey Global Institute



*2017 revenue for semiconductor EDA, IP, Materials, Critical Sub-Systems, and Equipment

SEMI

Engaging the Industry on Multiple Fronts



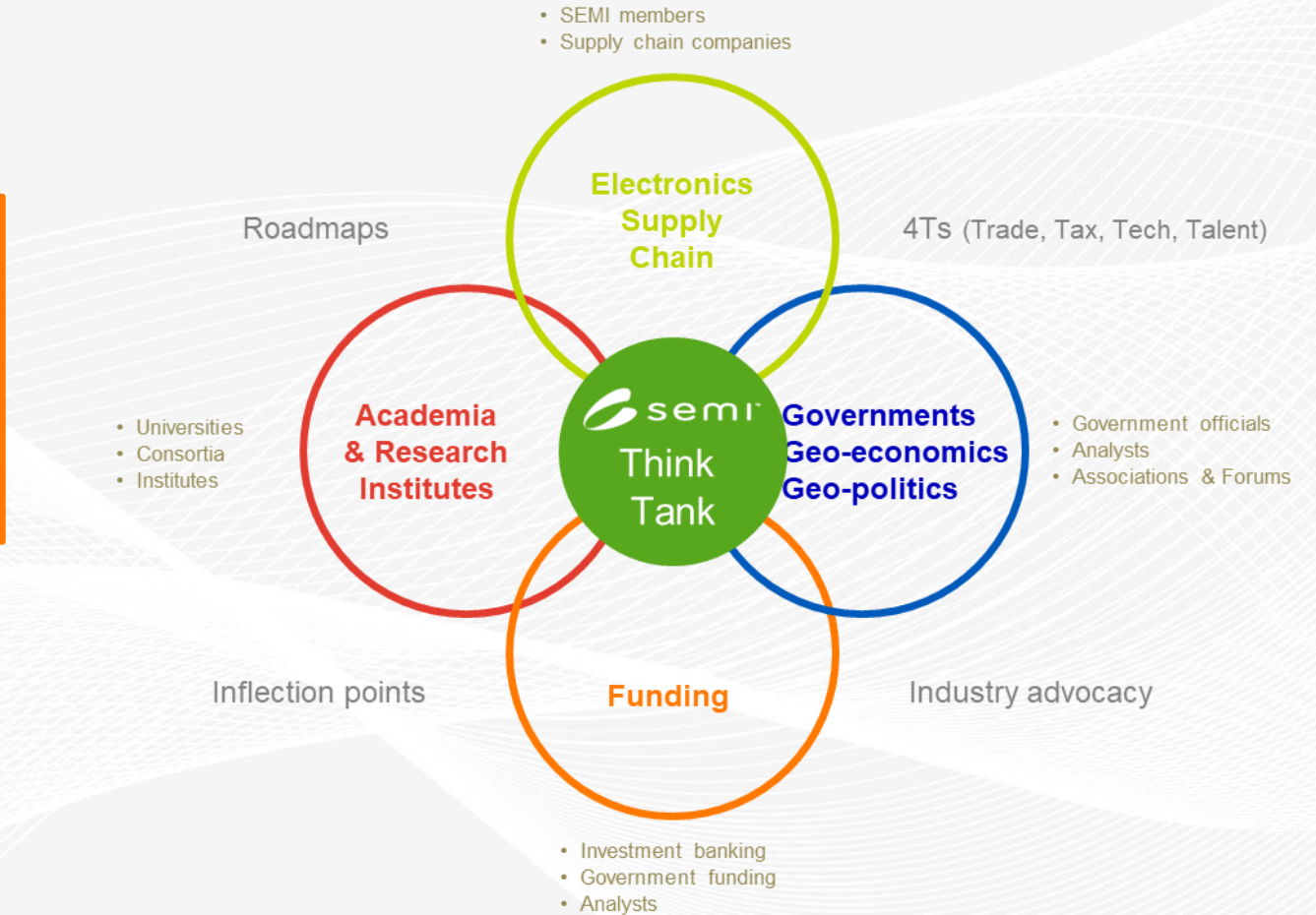
SEMI Think Tanks Help Foresee Potential Inflections & Disruptions



- **Horizon 2030** – intellectual roadmap for the digital economy
- **Where the world is headed**
- **Spans the entire digital economy**
- **Visionary *Collaboration for Innovation***
- **Charting the “intellectual roadmap”**
 - With implications for the electronics manufacturing supply chain

The sharpest minds from relevant disciplines with a focused scope...

**... will create Horizon 2030 plans and the Global Intellectual Roadmap...
... for the future of the Digital Economy**



What is SEMI Works™?

SEMI Works consists of three, fundamental pillars:

- *The process to ID required skills*, align courses with industry needs and a database to connect industry, talent & education / training
- *Mechanism to scale* the initiative through engaging regional partners
- *Programs to provide career and educational pathways* from K-12 higher education and adult/vet training

Why is SEMI leading the effort?

Access to, retaining and training required talent is an increasing challenge and top priority

- SEMI has the ability to address the issue
 - Membership = end-to-end electronics industry
 - 50-year history of facilitating collaborations and establishing industry standards
 - Internal expertise and organizational commitment and ability to scale
- Launching SEMI Works helps establish SEMI's level of commitment re WFD and help market SEMI's offerings

How does it work?

The process

- Industry working groups identify required skills
- Skills (competencies) are added to database
- Database enables matching of jobs to individuals with required skills and talent with training
 - Curriculum aligned w/industry needs is certified and added to database through *SEMI Certs* process
 - Jobs are profiled and entered into the database to facilitate matching
 - Stackable credentials are entered into the database as part of permanent learning record (can be credit bearing)
- Regional partners to enable scaling
 - Conduct outreach
 - Build participation to drive data collection
 - Scale SEMI endorsed programs

What are the Benefits?

Ability to match industry, talent and training

- *Curriculum* is aligned with industry requirements
- *Talent* can assess skills, find suited positions and where to go to fill skills gaps
- *Industry* can identify talent that meets requirements

Increases participation in training programs

- Those looking to enhance skills are directed to programs
- Employers can ID applicable courses
- Ecosystems turn out more, higher quality talent

Enhanced ability to identify, leverage and scale applicable training

- System supports internal training, apprenticeships, career laddering
- Course curation helps identify applicable programs
- College credits for qualified training and skills for career advancement

The Pillars of **SEMI Works™**

Infrastructure to build and connect the talent pipeline

- Ongoing industry input into unified competency model (UCM)
- Ability to link competencies to curriculum and certify
- Industry recognized credentials
- Comprehensive database/portal to connect industry-education-talent

Programs to provide career and educational pathways

- K-12
- High School
- Community College
- University
- Adult/veteran training

Mechanism to scale the initiative

- Scaling through regional partnerships
- Marketing and outreach
- SEMI's unique national/global reach and capabilities

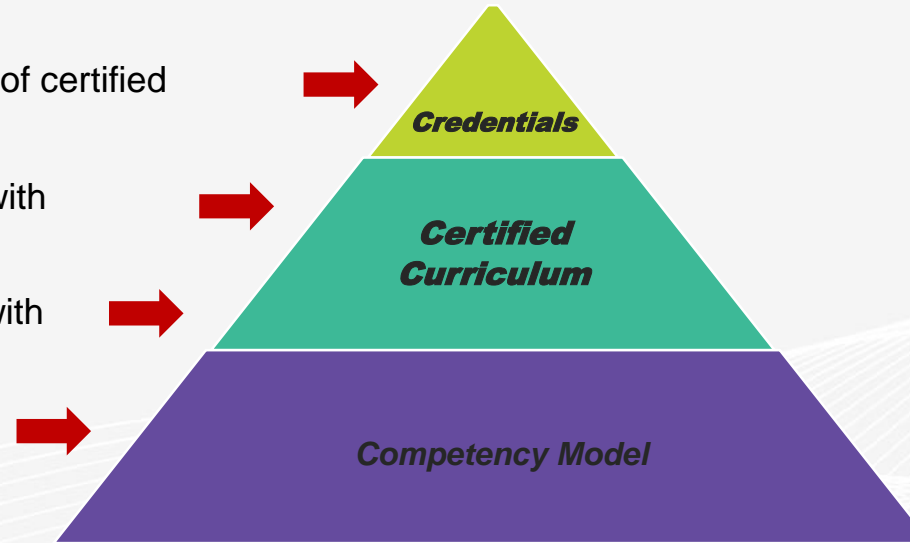
SEMI Works™ Infrastructure

Industry recognized credentials upon completion of certified courses

Assessment tool to profile and match talent with appropriate courses and positions

Certified curriculum to ensure continued alignment with employer requirements (“SEMI Certs”)

Industry provides input on required skills to ensure course curriculum reflects industry needs



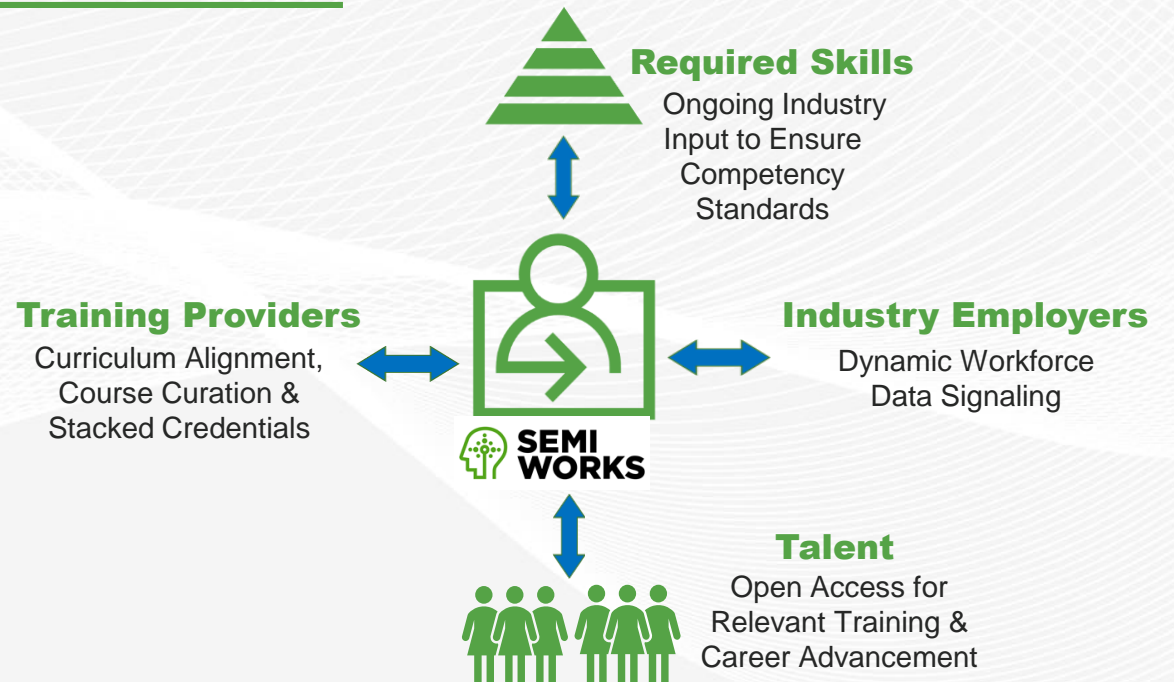
SEMI Works™ Portal

Connecting Industry/Talent/Training

Visibility In and Out of the Talent Pipeline



Connected Through SEMI Portal



SEMI Works™ Competency Model

A matrix of stackable competencies which are:

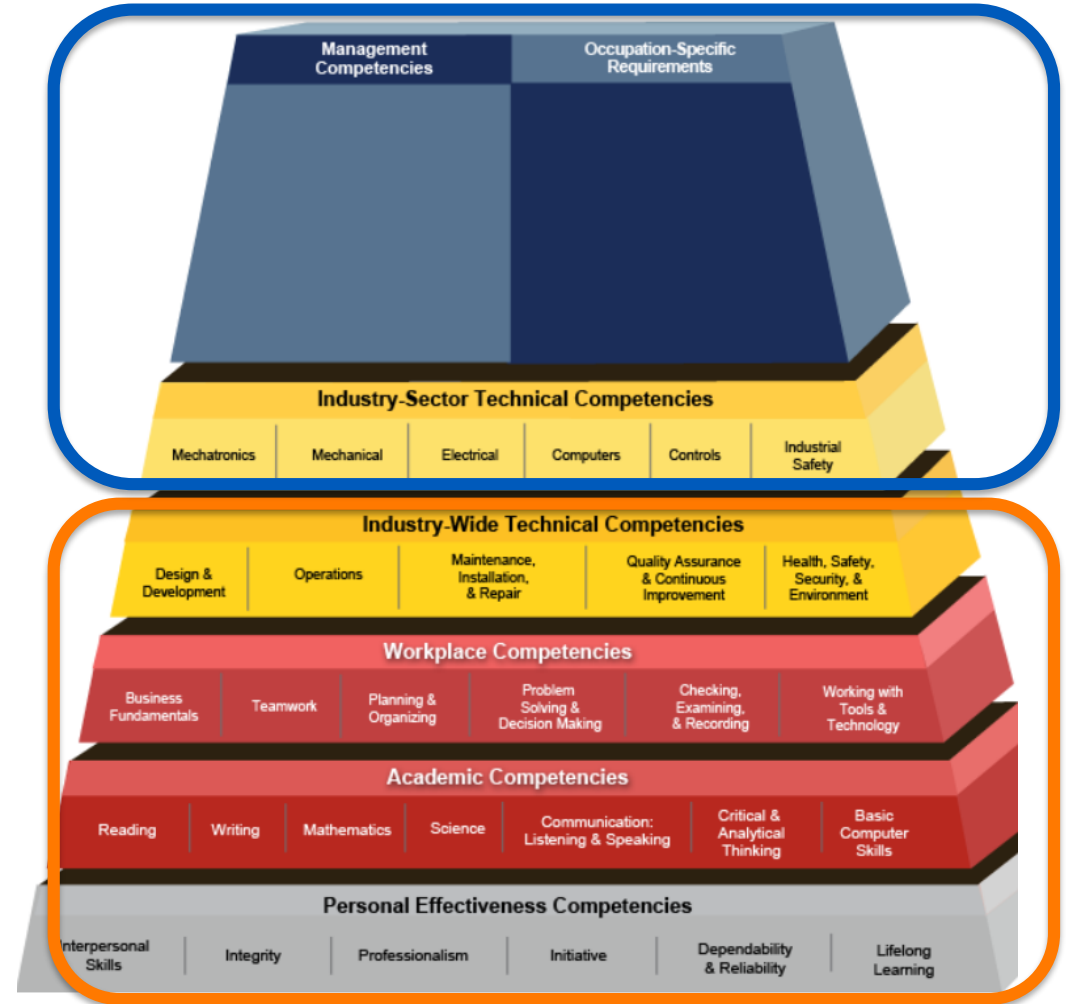
- Identified and approved by industry
- Reviewed, refined and revalidated every two years
- The data used to drive “SEMI Connect” portal

INDUSTRY SECTOR competencies are unique to a specific industry sector (ex: Semiconductor Mfg)

- With sub-sector and occupation specific competencies CODED and DEFINED in Levels 5 and 6

INDUSTRY WIDE competencies are shared across an entire industry sector (ex: Advanced Manufacturing)

- With shared competencies CODED and DEFINED in Levels 1-4



Coded, common definitions and relevancy levels are the key to fully leveraging the model

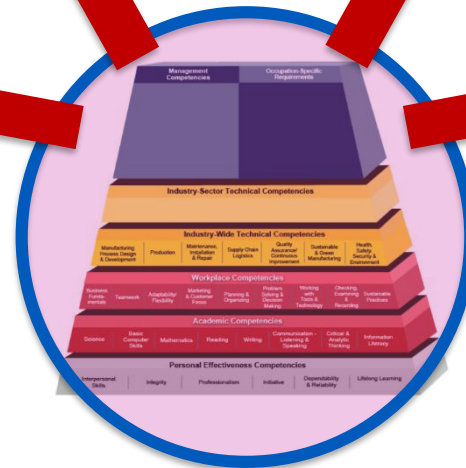
COMPETENCY PROFILES are created from the model and drive the matching required for: **Job Descriptions, Assessments, Training Programs, Certificates, or Individuals**

JOB PROFILE for: MAINTENANCE TECHNICIAN		Relevance / Proficiency Rating: 0 - No Experience / No Relevance 1 - Novice (limited experience) / Limited Relevance 2 - Intermediate (practical application) / Moderate Relevance 3 - Advanced (applied theory) / High Relevance 4 - Expert (recognized authority) / Vital Relevance
Competency Definition	Comp Code	Relevance / Proficiency Rating
Mathematical principles	2.3.1	4
Number systems and relationships - whole numbers, decimals, fractions, alternate base systems (e.g., binary, octal, and hexadecimal numbers)	2.3.1.1	3
Arithmetic - arithmetic operations on numbers, percentages, square root, exponentiation, and logarithmic functions	2.3.1.2	4
Plane and solid geometry - distance, perimeter, area, and volume, spatial coordinates, visualization, spatial reasoning, and geometric modeling	2.3.1.3	4
Measurement - measurement of length, mass, time, systems of measurement, units, and conversion between systems (e.g., from English to metric)	2.3.1.4	4
Mathematical notation - the language of mathematics to express mathematical ideas	2.3.1.5	3

CERTIFICATE PROFILE for: SEMI-CERT PROCESS TECH		Relevance / Proficiency Rating: 0 - No Experience / No Relevance 1 - Novice (limited experience) / Limited Relevance 2 - Intermediate (practical application) / Moderate Relevance 3 - Advanced (applied theory) / High Relevance 4 - Expert (recognized authority) / Vital Relevance
Competency Definition	Comp Code	Relevance / Proficiency Rating
Mathematical principles	2.3.1	4
Number systems and relationships - whole numbers, decimals, fractions, alternate base systems (e.g., binary, octal, and hexadecimal numbers)	2.3.1.1	3
Arithmetic - arithmetic operations on numbers, percentages, square root, exponentiation, and logarithmic functions	2.3.1.2	3
Plane and solid geometry - distance, perimeter, area, and volume, spatial coordinates, visualization, spatial reasoning, and geometric modeling	2.3.1.3	3
Measurement - measurement of length, mass, time, systems of measurement, units, and conversion between systems (e.g., from English to metric)	2.3.1.4	2
Mathematical notation - the language of mathematics to express mathematical ideas	2.3.1.5	3

DEGREE PROFILE for: AAS-MECHATRONICS		Relevance / Proficiency Rating: 0 - No Experience / No Relevance 1 - Novice (limited experience) / Limited Relevance 2 - Intermediate (practical application) / Moderate Relevance 3 - Advanced (applied theory) / High Relevance 4 - Expert (recognized authority) / Vital Relevance
Competency Definition	Comp Code	Relevance / Proficiency Rating
Mathematical principles	2.3.1	4
Number systems and relationships - whole numbers, decimals, fractions, alternate base systems (e.g., binary, octal, and hexadecimal numbers)	2.3.1.1	3
Arithmetic - arithmetic operations on numbers, percentages, square root, exponentiation, and logarithmic functions	2.3.1.2	3
Plane and solid geometry - distance, perimeter, area, and volume, spatial coordinates, visualization, spatial reasoning, and geometric modeling	2.3.1.3	3
Measurement - measurement of length, mass, time, systems of measurement, units, and conversion between systems (e.g., from English to metric)	2.3.1.4	2
Mathematical notation - the language of mathematics to express mathematical ideas	2.3.1.5	3

INDIVIDUAL PROFILE for: #23345		Relevance / Proficiency Rating: 0 - No Experience / No Relevance 1 - Novice (limited experience) / Limited Relevance 2 - Intermediate (practical application) / Moderate Relevance 3 - Advanced (applied theory) / High Relevance 4 - Expert (recognized authority) / Vital Relevance
Competency Definition	Comp Code	Relevance / Proficiency Rating
Mathematical principles	2.3.1	4
Number systems and relationships - whole numbers, decimals, fractions, alternate base systems (e.g., binary, octal, and hexadecimal numbers)	2.3.1.1	3
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What is SEMI Certs?

A process to ensure that curriculum is aligned with industry requirements

- “SEMI Cert stamp” means courses have gone through SEMI’s profiling process to determine alignment with industry requirements

Why is SEMI leading the effort?

Access to, training and retaining talent is a top priority for employers

- Currently there is no comprehensive way to align education / training with the needs of industry
- SEMI has a unique capability to engage industry and develop the process

How will it work?

Courses are profiled to determine alignment with industry requirements

- Curriculum is compared to SEMI’s “Unified Competency Model”, which is maintained by industry
- Once profiled, course data added to SEMI database
- SEMI’s web portal uses the database to match those seeking training to providers

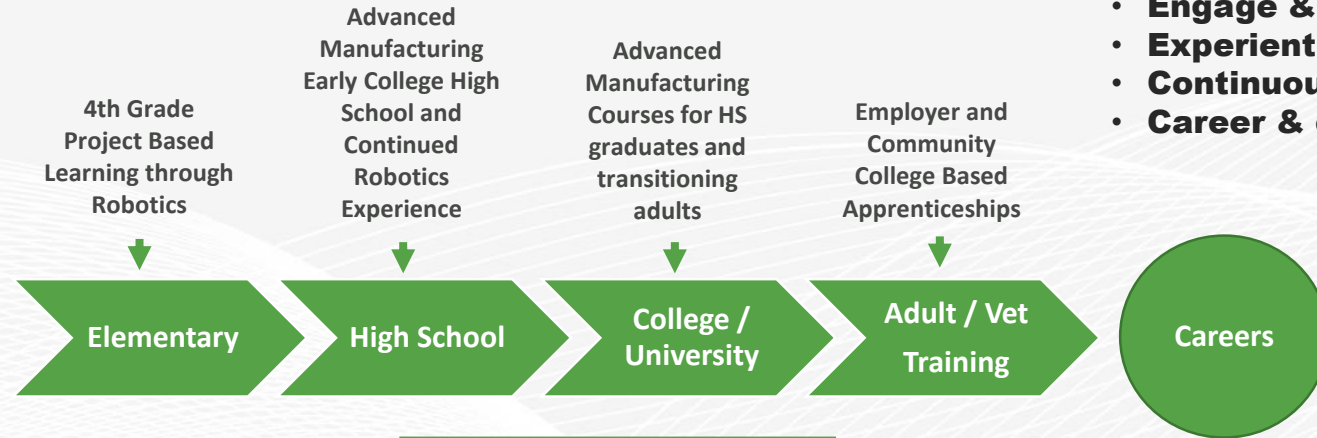
What are the Benefits?

Greater alignment between courses and industry requirements

- A scalable process to ensure alignment between training / education providers and industry
- The ability to match courses to those seeking training
- Improved marketing and increased awareness of aligned courses by individuals and employers

SEMI Works Programs and Mechanism to Scale

Endorsed Programs provide a Continuum of Learning



SEMI endorsed programs

- Engage & excite early
- Experiential learning
- Continuous engagement
- Career & education pathways

Current regional pilots to develop model to scale / sustain



Scaling Through Regional Partnerships

Stakeholder Benefits

- **Program providers**
 - **Program marketing**
 - **Increase in STEM interest**
 - **Connection to talent**
 - **Industry input into curriculum**
- **Job seekers**
 - **Job match**
 - **Skills assessment**
 - **Linkages to programs to fill skill gap**
- **Industry**
 - **Demand driven education/training**
 - **Linkage to talent**
 - **Ability to ID required skills**
 - **More uniform, higher level skills**
 - **Increase in talent in the pipeline**

NSF Grant – Partnership to help develop infrastructure

Funded through 2022

- \$6M over 3 yrs. - academic partner/grant administrator, SUNY Polytechnic Institute in NY
- Funding to develop and implement semiconductor workforce certificate program based on a “Unified Advanced Manufacturing Competency Model“

High Level Deliverables

- A process to collect ongoing input into industry workforce skills / competency requirements (within a “Unified Competency Model”)
- A system to enable matching between industry, individuals and training /education providers (a database/portal)
- Leveraging / trialing the above to create technician level training programs that align to industry requirements



An Example of Application

SEMI Works™
Veteran's Training and Placement Program

*"SERVING THOSE WHO
HAVE SERVED"*

Transitioning Veterans

Opportunities (Returning Service Members)

- Large volume of transitioning veterans in strategic regions
- Support services and financial resources available, including living stipend, tuition reimbursement
- Possess personal / professional / workplace effectiveness and high level of technical training

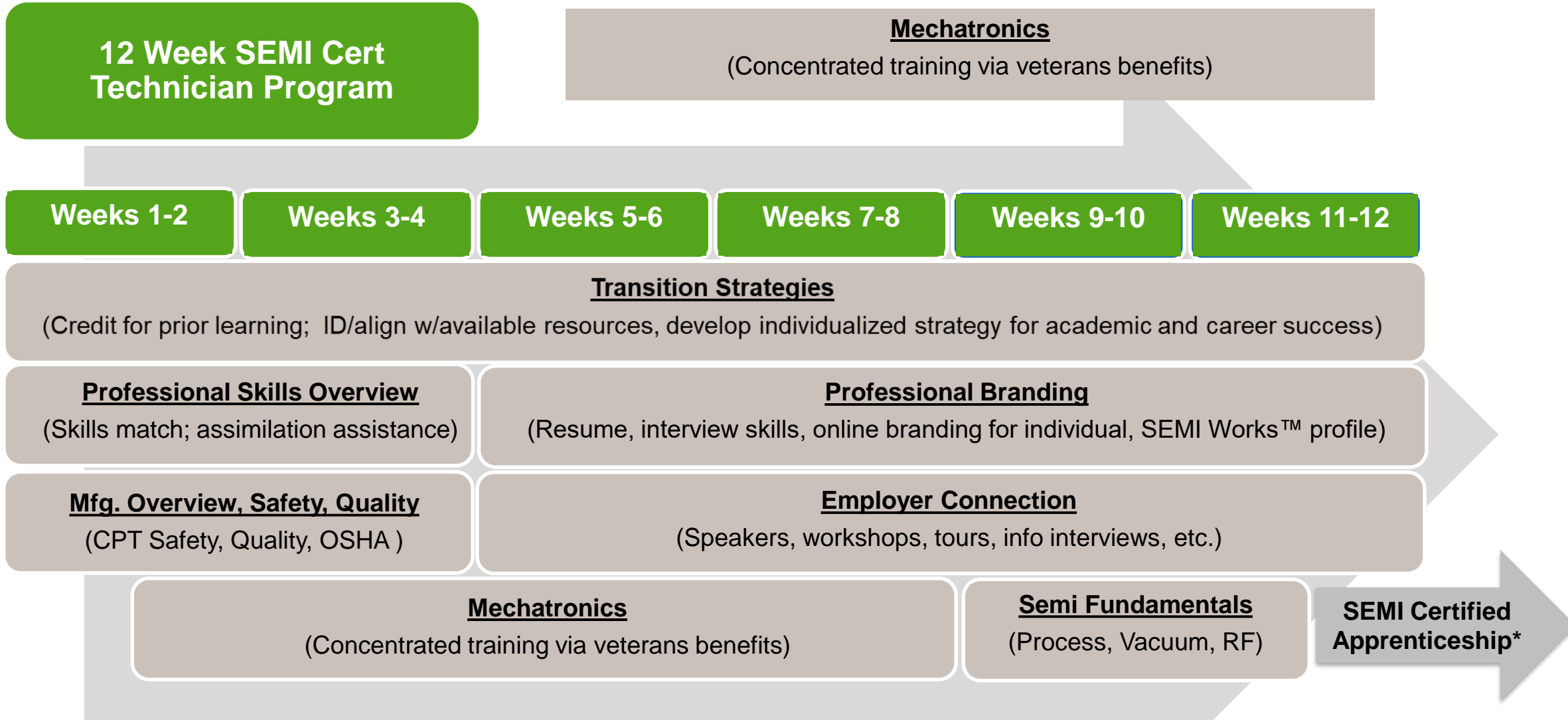
Opportunities (SEMI)

- SEMI Works™, “SEMI Certs” and SEMI Advanced Manufacturing Apprenticeship Program
- Careers with SEMI member companies

Challenges

- Veteran population is overgeneralized, blanket strategies are historically ineffective
- Support and financial services programs are fragmented and underutilized
- Personalized but efficient strategies are required for personal / professional transition and success
- Employer cultures are not congruent with military culture and expectations

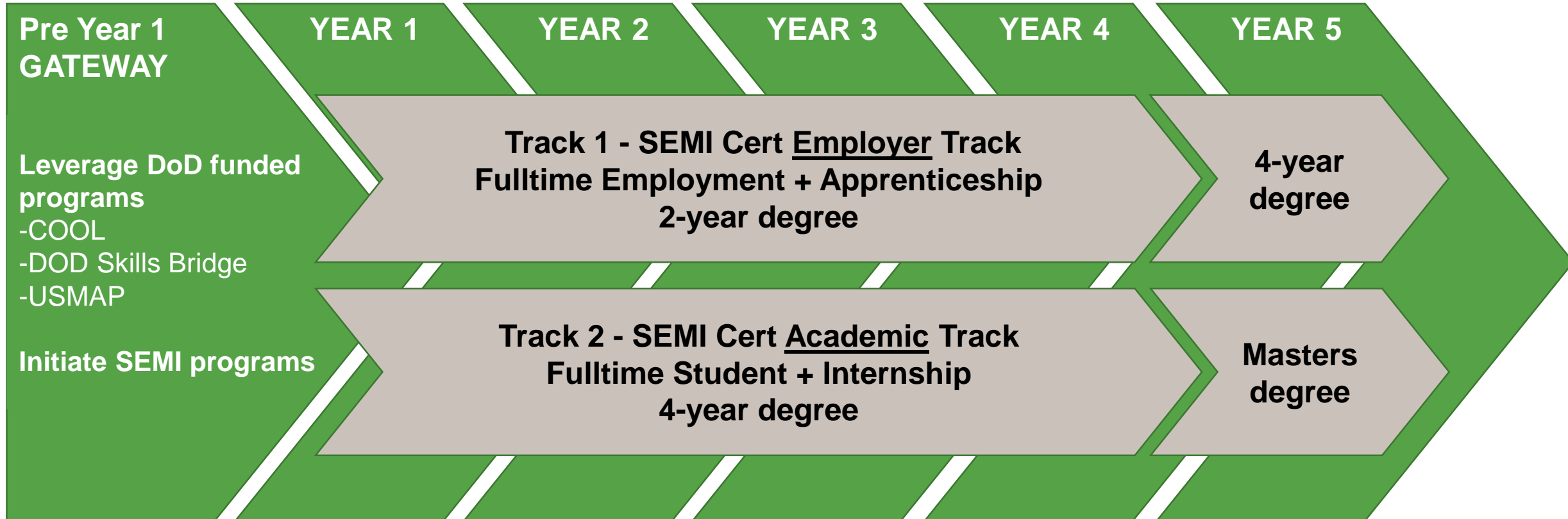
Transitioning Veterans Technician Program – *The Foundation*



* Once completing SEMI Certified Apprenticeship, will receive industry recognized SEMI Credential, credits for qualified skills, ongoing skills assessment and enhancement opportunities, connection to online Vet community

2 Options - Employer vs. Academic Track

(Full time Employer vs. Full time Student)



Q&A

