UNC CHARLOTTE
BELK COLLEGE *of* BUSINESS

Office of the Dean

9201 University City Blvd, Charlotte, NC 28223-0001
t/ 704.687.7577 f/ 704.687.4014 www.belkcollege.uncc.edu

To: Dr. Joan F. Lorden
Provost and Vice Chancellor for Academic Affairs

From: Dr. Steven H. Ott
Dean, Belk College of Business

Date: March 6, 2018

Re: CIP code change for BSBA with a major in Management Information Systems

The Belk College of Business is requesting a change in the CIP code for the Bachelor of Science in Business Administration (BSBA) with a major in Management Information Systems. The existing CIP code is 52.1201, "Management Information Systems, General", and the College would like to change the CIP code to 11.0103, "Information Technology". The Management Information Systems program's curriculum is more closely aligned with CIP code 11.0103. CIP code 11.0103 also falls within the Department of Homeland Security's STEM designated degree program list, and the program CIP code change to CIP code 11.0103 would allow the program to more clearly signal to potential students and employers the program's STEM-related content and enable international students graduating with a BSBA in Management Information Systems to qualify for a 24-month extension of their optional practical training period.

An analysis of UNC Charlotte's BSBA in Management Information Systems curriculum is compared to curricula from identified STEM designated undergraduate Management and Computer Information Systems programs in the U.S.

Should you or other individuals in the review process have any questions, please do not hesitate to contact me.

Request to Change the CIP Code for the Belk College of Business BSBA in Management Information Systems Program

UNC Charlotte was authorized to offer the Bachelor of Science in Business Administration degree in 1972. As this program grew, specializations within the degree were subdivided into seven programs in 1992, including a BSBA in Management Information Systems. Since then, the program has evolved to reflect advances in information systems and technologies, though the major CIP code has not been updated.

Faculty from the Department of Business Information Systems and Operations Management (BISOM), the BISOM Department Chair, and the Director of Academic Planning and Accreditation conducted a program analysis to explore both our CIP code and with the curricula of other business schools utilizing a STEM designation for similar programs. Through this analysis, the department committee found that the current CIP code is not the best fit for UNC Charlotte's BSBA in Management Information Systems curriculum.

The current CIP code for the BSBA in Management Information Systems is 52.1201, "Management Information Systems, General", where the definition is as follows: "A program that generally prepares individuals to provide and management data systems and related facilities for processing and retrieving internal business information; select systems and train personnel; and respond to external data requests. Includes instruction in cost and accounting information systems, management control systems, personnel information systems, data storage and security, business systems networking, report preparation, computer facilities and equipment operation and maintenance, operator supervision and training, and management information systems policy and planning." In contrast, the STEM-designated "Information Technology" CIP Code 11.0103 definition is as follows "A program that focuses on the design of technological information systems, including computing systems, as solutions to business and research data and communications support needs. Includes instruction in the principles of computer hardware and software components, algorithms, databases, telecommunications, user tactics, application testing, and human interface design."

Curriculum Overview

The revised BSBA in Management Information Systems program prepares students to make sound business decisions by collecting and analyzing data on customers, suppliers, competitors, and their inputs. Students acquire a combination of technical and organizational competencies required to effectively develop technology for business needs. The revised structure will require a common set of three required core major courses and two restrictive elective courses; students will continue to take the core business courses taken by other majors in the College. This streamlines the management information systems curriculum while also differentiating it from the revised BSBA in Business Analytics curriculum, which is also offered within the College.

The BSBA in Management Information Systems combines the design of technological information systems with business decision-making to prepare graduates for information

technology and analytical positions in a variety of industries. The program focuses on the management, development, and support of enterprise systems, networks, databases, and systems, as well as related competencies such as information security and project management. Students take required major courses in *Business Applications Development*, *Data and Information Management*, and *Business Information Systems Analysis and Design*, as well as two major elective courses, where many of the electives are focused on expanding an individual's information technology and/or analytical skills.

All three required major courses focus on content directly related to the design of technological information systems as solutions to business problems. INFO 3231, *Business Applications Development*, aims to equip students with the ability to effectively design, develop, and test business applications written in an object-oriented programming language. Students learn the underlying foundations of programming and coding, how to create graphical user interfaces for windows applications, and how to develop, test, and document a professional looking software package. INFO 3233, *Data and Information Management*, teaches students how to design and implement databases for business applications. Students develop the ability to effectively design and implement relational databases for business, understand data modeling and the application of both the entity-relationship and normalization approaches to the design of relational databases, and use database management software to structure, query, and update databases through the use of SQL. INFO 3234, *Business Information Systems Analysis and Design*, provides students with an understanding of the technical and managerial issues that are important in the context of business systems development. Students acquire significant hands-on experience with the use of tools used by business systems analysts. Refer to Appendix I for course descriptions.

As the BSBA in Management Information Systems curriculum has evolved, so have the student learning outcomes. Intended outcomes for students earning a BSBA in Management Information Systems degree from UNC Charlotte include:

1. Students will demonstrate the ability to develop a business application.
2. Students will demonstrate knowledge of database design and implementation by building databases and queries.
3. Students will demonstrate knowledge of the content, processes, and techniques applied to business systems design.

Refer to Appendix II for the BSBA in Management Information Systems assurance of learning curriculum map.

As evidenced throughout the curriculum and program student learning outcomes, the BSBA in Management Information Systems program has evolved to focus on teaching students how to design and develop information systems as solutions to business problems. Emphasis is placed on both communicating the business needs and developing solutions to business problems. The BSBA in Management Information Systems teaches students how to manage, develop, and support information systems, which is directly aligned with CIP code 11.0103.

STEM Designation Analysis

The Belk College of Business also conducted an analysis to determine whether the College's comparison schools (as identified through our AACSB International specialized accreditation) and UNC System business schools have STEM designated programs. The majority of the College's aspirant, comparable, and competitive business schools have STEM designated business programs. Appendix III provides an overview of the STEM designated programs that our aspirant, comparable, and competitive business schools offer, as well as those offered by other UNC System business schools.

Through further analysis we uncovered that within this comparison school group just over half of the schools offer an undergraduate Management Information Systems program or variation of this program (e.g., Business Information Systems, Business Analytics/Information Systems, Computer Information Systems, Information Technology and Systems, or Information Systems) through their business school. Appendix IV provides an overview of the Management Information Systems programs or variations across our comparison institutions. Of the schools that offer such a program, more than one third have a STEM-designated CIP code.

We also examined the curriculum at four undergraduate Management Information Systems programs that are advertised as being STEM-designated. As evidenced in the table below, our BSBA in Management Information Systems curriculum requires similar content.

Table 1. Course Content at Schools Offering an Undergraduate Management Information Systems Program Under CIP Code 11.0103.

Topic	UNC Charlotte	Oklahoma State University	University of Texas at Dallas	California State University at Long Beach	St. Augustine's University
Computer Hardware and Software Components	2 required courses, 2 elective courses	4 required courses, 2 elective courses	3 required courses, 3 elective courses	2 required courses, 8 elective courses	4 required courses
Algorithms	1 elective course	1 elective course	1 elective course	1 elective course	
Databases	1 required course, 1 elective course	1 required course	1 required course	1 required course, 1 elective course	1 required course
Telecommunications	1 elective course	1 required course		1 elective course	1 required course
User Tactics					
Application Testing	2 required courses		1 required course	1 required course	1 required course
Human Design Interface	1 required course	1 required course		1 elective course	1 required course

Additionally, we consulted with UNC Charlotte's College of Computing and Informatics on this CIP code change and received their support. Refer to Appendix V for their letter of support.

As the College strives to differentiate our programs while remaining competitive in the Carolinas, the STEM designation is one way to distinguish our program and differentiate it from other undergraduate Management Information Systems programs.

As noted above, the STEM designation will help the College better serve international students, while signaling the high level of technical content in the program to potential employers of all students. The STEM designation allows for a significant extension in the Optional Practical Training (OPT) period for international graduates wishing to live and work in the U.S. The extended OPT period can allow international students to be employed longer in the U.S. while working with companies to obtain a work visa.

Not only does the STEM designation have the potential to help UNC Charlotte's Belk College of Business attract more high-quality international students into our program, it will also help the UNC System achieve its strategic goal related to economic impact and community engagement: "While maintaining excellence in the delivery of a foundational liberal arts education, increase the number of high quality credentials awarded in health sciences, STEM, K-12 education, and other emerging regional workforce needs".[1]

[1] https://www.northcarolina.edu/sites/default/files/approved_definitions_goals_metrics_targets_january_2017_final.pdf

Appendix I: BSBA with a Major in Management Information Systems Course Descriptions

Required:

INFO 3231, *Business Applications Development* (3). A study in the development of business applications software. Course emphasizes graphical user interface development using object-oriented, event-driven programming methods and techniques with a high-level development tool such as Visual Basic or Java.

INFO 3233, *Data and Information Management* (3). A study of an implementation of databases for business applications. Exploration of basic concepts of design and the use of SQL to create and manipulate corporate databases.

INFO 3234, *Business Information Systems Analysis and Design* (3). Examination of business information systems from the perspective of the systems analyst to provide an understanding of concepts, processes, and techniques as they are applied to the systems development life cycle. Emphasis on the use of structured and object-oriented techniques to manage the complexities involved in the analysis phase of systems development.

Electives:

INFO 3229, *Business Data Communications and Information Security* (3). A study of the current and potential impact of computer data communications technologies and information security on business operations and productivity. Topics include: designing, planning, and implementing solutions in such areas as local area networks, networked applications, and information assurance.

INFO 3230, *Enterprise Systems* (3). A problem-solving based overview of enterprise systems. Through experiential learning, students understand how business processes such as sales, logistics, production, procurement, finance, accounting, and human resources are supported in ERP software. Students also learn how to configure an ERP system to meet best practices.

INFO 3236, *Business Analytics I* (3). Various data mining and business intelligence methods, such as rule-based systems, decision trees, and logistic regression. Query and reporting, online analytical processing (OLAP), and statistical analysis. Issues relating to modeling, storing, securing, and sharing the organizational data resources.

INFO 3240, *eBusiness Systems* (3). A study of the evolving information technologies facilitating electronic business (eBusiness) and the business practices and strategies used to compete in the new wired global marketplace. Topics include: the infrastructure for eBusiness, new business strategies and models, web design, and management strategies, and an exploration of a variety of technologies involved in eBusiness.

OPER 3203, *Decision Modeling and Analysis* (3). Analytical approach to understanding the management process and solving management problems with emphasis on model formulation, solution techniques, and interpretation of results. Topics include: techniques such as linear, integer, goal, and multi-objective programming; queuing theory and applications; decision support via Monte Carlo simulation; decision making under uncertainty and risk; decision trees; and multi-criteria decision making. Microsoft Excel is the main analytical tool.

OPER 3204, *Management of Service and Project Operations* (3). Examines both strategic and operational decision making in service management with emphasis on the latter. Topics include: service strategy, designing new services, assessing and improving service quality, improving the efficiency and effectiveness of service processes, service process design and service facility location, managing waiting lines, managing service projects, and the integration of technology into service operations.

OPER 3206, *Quality Assurance and Management* (3). A study of management philosophy, practices, and analytical processes implemented in quality planning and administration of products and services. Topics include: corporate culture, quality design, human factors and motivation, quality cost analyses and auditing, service quality, quality assurance, quality circles, and conformance to design.

Appendix II: BSBA with a Major in Management Information Systems Assurance of Learning Curriculum Map

Student Learning Outcomes and Effectiveness Measures	Where Assessment Occurs		
	INFO 3231 *Business Applications Development*	**INFO 3233** *Business Database Systems*	**INFO 3234** *Business Systems Development*
	Spring	Fall	Fall
1. Students will demonstrate the ability to develop a business application.	**X**		
a. Students will demonstrate knowledge of an object-oriented programming language.	X		
b. Students will demonstrate knowledge of event-driven programming methods and techniques.	X		
c. Students will demonstrate the ability to design user interfaces for applications.	X		
2. Students will demonstrate knowledge of database design and implementation by building databases and queries.		**X**	
a. Students will demonstrate the ability to develop a business database.		X	
b. Students will demonstrate the ability to build SQL queries.		X	
c. Students will demonstrate the ability to explain the principles of designing and implementing business databases.		X	
3. Students will demonstrate knowledge of the content, processes, and techniques applied to business systems design.			**X**
a. Students will demonstrate knowledge of tasks, responsibilities, and techniques used to develop systems.			X
b. Students will demonstrate the ability to evaluate business information system project proposals.			X
c. Students will demonstrate knowledge of how to manage projects using critical path analysis.			X

Appendix III: Other Business Schools with STEM Designated Programs

School	Comparison Group	STEM Designated Business Program	Program(s)
Georgia State University	Aspirant	Yes	• MS in Mathematical Risk Management (previously MS in Risk Management and Insurance, 27.0305) • MS in Analytics (52.1399) • MS in Information Systems (11.0101) • MBA, Business Analysis concentration (14.3701) • MBA, Information Systems concentration (11.0101) • Master of Actuarial Science (52.1304) • BBA in Actuarial Science (52.1304) • BBA in Computer Information Systems (11.0101)
University of Louisville	Aspirant	No	
University of Pittsburgh	Aspirant	Yes	• MS in Management Information Systems • MBA/MS in Management Information Systems
University of South Florida	Aspirant	Yes	• MS in Business Analytics/Information Systems (11.0501)
University of Texas at Dallas	Aspirant	Yes	• MS in Business Analytics (52.1399) • MS in Energy Management (52.1399) • MS in Financial Engineering and Risk Management (27.0305) • MS in Information Technology and Management (11.0401) • MS in Management Science (52.1301) • MS in Supply Chain Management (52.1301) • MS in Systems Engineering and Management (14.2701) • BS in Information Technology and Systems (11.0103) • BS in Supply Chain Management
Kent State University	Comparable	Yes	• MS in Business Analytics (52.1301)
Old Dominion University	Comparable	No	
Temple University	Comparable	Yes	• MS in Actuarial Science • MS in Business Analytics • MS in Financial Analysis and Risk Management • MS in Financial Engineering • MS in IT Auditing and Cyber-Security • MS in Statistics • BBA in Management Information Systems
University of Cincinnati	Comparable	Yes	• MS in Applied Economics • MS in Business Analytics • MS in Finance • MS in Information Systems • BS in Business Analytics • BS in Industrial Management
University of Colorado Denver	Comparable	Yes	• MS in Business Analytics (52.1301) • MS in Information Systems (11.0401)
University of Houston	Comparable	No	

School	Comparison Group	STEM Designated Business Program	Program(s)
University of Memphis	Comparable	Yes	• MS in Information Systems (11.0103) • Graduate Certificate in Business Project Management (11.1005) • Graduate Certificate in Business Intelligence and Analytics (52.1301)
University of Texas at San Antonio	Comparable	Yes	• PhD in Applied Statistics (27.0501) • MS in Applied Statistics (27.0501) • MS in Data Analytics (52.1302) • MS in Information Technology (11.0401) • BBA in Actuarial Science (52.1304) • BBA in Cyber Security (11.1003) • BBA in Management Science (52.1301)
University of Wisconsin-Milwaukee	Comparable	Yes	• PhD in Management Science (52.1399) • MS in Information Technology Management (11.0103)
Virginia Commonwealth University	Comparable	Yes	• MS in Computer and Information Systems Security (11.1003) • MS in Decision Analytics (52.1301) • MS in Information Systems (11.0401) • Graduate Certificate in Information Systems (11.0401) • BS in Information Systems (11.0401)
Appalachian State University	Competitive	Yes	• MS in Applied Data Analytics (11.0802) • Graduate Certificate in Business Analytics (11.0802)
Clemson University	Competitive	No	
East Carolina University	Competitive	Yes	• Graduate Certificate in Business Analytics (11.0802) • MS in Quantitative Economics and Econometrics (45.0603, not in business school)
Elon University	Competitive	Yes	• MS in Management (52.1301)
North Carolina State University	Competitive	Yes	• Masters of Financial Mathematics (27.0305) • MS in Analytics (11.0802)
Northeastern University	Competitive	Yes	• MS in Business Analytics (52.1302) • BS in Accounting (27.0101) • BS in Entrepreneurship and New Venture Management (27.0101) • BS in Finance (27.0101) • BS in Management (27.0101) • BS in Marketing (27.0101) • BS in Management Information Systems (27.0101) • BS in Supply Chain Management (27.0101)
Queens University	Competitive	No	
University of South Carolina	Competitive	Yes	• Graduate Certificate in Business Analytics (52.1302) • BSBA in Management Science (52.1301)
Wake Forest University	Competitive	Yes	• MS in Business Analytics
Winthrop University	Competitive	No	

School	Comparison Group	STEM Designated Business Program	Program(s)
Appalachian State University	UNC System	Yes	• MS in Applied Data Analytics (11.0802) • Graduate Certificate in Business Analytics (11.0802)
East Carolina University	UNC System	Yes	• Graduate Certificate in Business Analytics (11.0802) • MS in Quantitative Economics and Econometrics (45.0603, not in business school)
Elizabeth City State University	UNC System	No	
Fayetteville State University	UNC System	No	
North Carolina A&T State University	UNC System	No	
North Carolina Central University	UNC System	Yes	• BS in Computer Science and Business (11.0199)
North Carolina State University	UNC System	Yes	• Masters of Financial Mathematics (27.0305) • MS in Analytics (11.0802)
UNC Asheville	UNC System	No	
UNC Chapel Hill	UNC System	No	
UNC Charlotte	UNC System	Yes	• MS in Mathematical Finance (27.0305) • PSM in Data Science and Business Analytics (52.1399) • Graduate Certificate in Applied Econometrics (45.0603) • Graduate Certificate in Business Analytics (52.1399) • Graduate Certificate in Data Science and Business Analytics (52.1399)
UNC Greensboro	UNC System	Yes	• Masters in Information Technology and Management (11.0901) • BS in Information Systems and Supply Chain Management (11.0901)
UNC Pembroke	UNC System	No	
UNC Wilmington	UNC System	Yes	• MS in Computer Science and Information Systems (11.0101)
Western Carolina University	UNC System	No	
Winston-Salem State University	UNC System	Yes	• BS in Management Information Systems (11.0401)

Appendix IV: Undergraduate Management Information Systems Programs at Comparison Institutions

School	Comparison Group	Undergraduate Management Information Systems (or Similar) Programs within the Business School	STEM Designation
Georgia State University	Aspirant	Yes[1]	Yes
University of Louisville	Aspirant	Yes[1]	No
University of Pittsburgh	Aspirant	Yes[2]	No
University of South Florida	Aspirant	Yes[3]	No
University of Texas at Dallas	Aspirant	Yes[4]	Yes
Kent State University	Comparable	Yes[1]	No
Old Dominion University	Comparable	Yes[4]	No
Temple University	Comparable	Yes	Yes
University of Cincinnati	Comparable	Yes[5]	No
University of Colorado Denver	Comparable	Yes[5]	No
University of Houston	Comparable	Yes	No
University of Memphis	Comparable	No	--
University of Texas at San Antonio	Comparable	Yes[5]	No
University of Wisconsin-Milwaukee	Comparable	No	--
Virginia Commonwealth University	Comparable	Yes[5]	Yes
Appalachian State University	Competitive	Yes[1]	No
Clemson University	Competitive	No	--
East Carolina University	Competitive	Yes	No
Elon University	Competitive	No	--
North Carolina State University	Competitive	No	--
Northeastern University	Competitive	Yes	Yes
Queens University	Competitive	No	--
University of South Carolina	Competitive	No	--
Wake Forest University	Competitive	No	--
Winthrop University	Competitive	No	--
Appalachian State University	UNC System	Yes[1]	No
East Carolina University	UNC System	Yes	No
Elizabeth City State University	UNC System	No	--
Fayetteville State University	UNC System	Yes	No
North Carolina A&T State University	UNC System	No	--
North Carolina Central University	UNC System	No	--
North Carolina State University	UNC System	No	--
UNC Asheville	UNC System	No	--
UNC Chapel Hill	UNC System	No	--
UNC Greensboro	UNC System	Yes[6]	Yes
UNC Pembroke	UNC System	No	--
UNC Wilmington	UNC System	No	--
Western Carolina University	UNC System	Yes[1]	No
Winston-Salem State University	UNC System	Yes[1]	Yes

[1] Computer Information Systems
[2] Business Information Systems
[3] Business Analytics/Information Systems

[4] Information Technology and Systems or Information Systems and Technology
[5] Information Systems
[6] Information Systems and Operations Management

Appendix V: Letter of Support from the College of Computing and Informatics

UNC CHARLOTTE
College of Computing and Informatics

Dr. Manuel A. Pérez Quiñones
Associate Dean, College of Computing
9201 University City Boulevard
Charlotte, NC 28223-0001
t/ 704-687-8553
http://cci.uncc.edu

February 27, 2018

To whom it may concern:

Thank you for consulting with the College of Computing and Informatics on the proposal to change the CIP code for the Bachelor of Science in Business Administration (BSBA) with a major in Management Information Systems. On behalf of the College of Computing and Informatics, I offer my support of the proposal.

Sincerely

Manuel A. Pérez Quiñones

Proposed CIP Code Change
College of Arts + Architecture, UNC Charlotte
Program title: Architecture
Degree: MArch
Current CIP Code: 04.0201

Proposed New CIP Code: 04.0902
Architecture and Building Sciences/Technology
Definition: A program that focuses on the application of advanced technology to building design and construction, retrofitting existing buildings, and efficient operation of buildings, including lighting and daylight design, acoustics, solar design, building conservation, and energy-conscious design. Includes instruction in architecture, building technology, civil and structural engineering, mechanical engineering, environmental control systems, sustainability, and computer tools and applications.

Request Justification:
CIP 040902 serves our programs' strength in building sciences, environmental stewardship, and digital technology. 040902 allows graduates to work for 3 years in the US after graduation, corresponding to the average work experience required by the National Council of Registration Board to become a licensed architect. This allows our international graduates to earn licensure, aligns with peer institutions, helps student recruitment, and builds upon H.R.2353- Strengthening Career and Technical Education for the 21st Century Act (passed by Congress on 07-31-2018), which designates Architecture as a STEM subject.

Request to Change the CIP Code
for the UNC Charlotte School of Architecture's Master of Architecture

Request

The School of Architecture (SoA) at UNC Charlotte has conducted a program analysis to explore its current Master of Architecture (M.Arch.) CIP code designation relative to other schools of architecture utilizing a STEM designation. Through this analysis, the department committee found that the current CIP code of 04.0201 is not the best fit for SoA's curriculum. Additionally, recent federal legislation has broadened the definition of STEM fields to now include Architecture as a STEM discipline. Therefore, the SoA is requesting that its current CIP code be changed to 04.0902, which reflects its curricular content and to take advantage of new federal classifications.

> **Current CIP Code: 04.0201 Architecture:** *A program that prepares individuals for the independent professional practice of architecture and to conduct research in various aspects of the field. Includes instruction in architectural design, history, and theory; building structures and environmental systems; project and site planning; construction; professional responsibilities and standards; and related cultural, social, economic, and environmental issues.*
>
> **Proposed New CIP Code: 04.0902 Architecture and Building Sciences/ Technology:** *A program that focuses on the application of advanced technology to building design and construction, retrofitting existing buildings, and efficient operation of buildings, including lighting and daylight design, acoustics, solar design, building conservation, and energy-conscious design. Includes instruction in architecture, building technology, civil and structural engineering, mechanical engineering, environmental control systems, sustainability, and computer tools and applications.* [1]

Rationale

UNC Charlotte's School of Architecture has increased its research capacities and its efforts to address emerging needs in the profession and allied design disciplines through both curricular and faculty initiatives. These efforts build upon the School's 2015-2020 Strategic Plan and its stated goal of "Advancing Excellence in the Built Environment through Research and Interdisciplinary Collaboration." This goal reflects the on-going need for schools of architecture to nimbly address changes in the professional marketplace and work environment.

---

[1] https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=87962

For example, according to *DesignIntelligence's Best Architecture Schools 2015* report, which polled 78 deans and chairs and over 1,000 architectural offices (respondents were allowed to provide multiple answers), the most significant concerns facing the profession included sustainability (49%), technological change (42%), and integrated design (47%). Similarly, the research priorities of the American Institute of Architects focus on design and health, building performance, innovations in construction and materials, and building information systems and design computation.[2]

These interests are reflected in the SoA's M.Arch. overall curriculum, which integrates a range of architectural, computational, environmental and building sciences with architectural design, history, and professional studies through both required coursework and elective content. UNC Charlotte's M.Arch. curriculum addresses each of the topic areas listed in the definition of CIP code 04.0902 with over 50% its courses addressing those topics directly (see Attachment 1).

Our request follows after years of discussion between architects and educators, which recently (July 2018) resulted in the successful passing of H.R. 2353, the Carl D. Perkins Career and Technical Education (CTE) Act (see Attachment 4)**.**[3] Universities and the American Institute of Architects lobbied for this legislation in order to achieve several goals: to encourage greater diversity in professional workforces; to recognize architecture as a synthesis of design, art, and a wide range of sciences and technologies as they intersect with the built environment; and to open new avenues for faculty and student research support. In this sense, Architecture's role as the intersection of several disciplines, and its recognition as a STEM discipline acknowledges the profession's long history of ingenuity and technical innovation.

This proposal also aligns with the University of North Carolina system mission to "discover, create, transmit, and apply knowledge to address the needs of individuals and society" through "research, scholarship, and creative activities, which advance knowledge and enhance the educational process."[4]

Similar Programs in the UNC System and Nation

Other universities across the country have already made this change. North Carolina State University, for example, requested a CIP code change for its Master of Architecture program in 2018 and will go before the System Board in late January of 2019.

For architecture programs with the STEM CIP code, their international graduates may stay in the US for three years after graduation; and their faculty and students have been able to take

---

[2] https://www.aia.org/pages/5626-architectural-research

[3] https://www.aia.org/articles/206266-career-and-technical-education-bill-to-reco

[4] http://northcarolina.edu/About-Our-System/Our-Mission

advantage of STEM related funding and research. Prospective international students regularly inquire if UNC Charlotte's M.Arch. degree is a STEM-designated degree and we are losing these applicants to other universities; additionally, international applications to our program have declined in recent years. Changing the M.Arch.'s designation to a STEM program will enable the SoA to remain competitive in the Carolinas and across the country.

U.S. Schools of Architecture with Master of Architecture Degrees Classified as STEM*

Arizona State University Tempe
Ball State University
Carnegie Mellon University
Clemson University*
Columbia University
Georgia Institute of Technology*
Harvard University*
North Carolina State University*
Philadelphia University
Rensselaer Polytechnic Institute
Savannah College of Art and Design*
Southern California Institute of Architecture
University of Miami*
University of Michigan
University of Massachusetts Amherst
University of Minnesota Twin Cities
University of Pennsylvania
University of Virginia*
University of Washington Seattle

**denotes regional peer institutions*

As noted above, the STEM designation will help the School of Architecture at UNC Charlotte better serve international students, while signaling the high level of technical content in the program to potential employers of all students. The STEM designation allows for a significant extension in the Optional Practical Training (OPT) period for international graduates wishing to live and work in the U.S. The extended OPT period can allow international students to be employed longer in the U.S. while working with companies to obtain a work visa and while working towards their required architectural experience hours and professional licensure.

Not only does the STEM designation have the potential to help UNC Charlotte's School of Architecture attract high-quality domestic and international students into our program, it will also help the UNC System achieve its strategic goal related to economic impact and community engagement: "While maintaining excellence in the delivery of a foundational liberal arts education, increase the number of high quality credentials awarded in health sciences, STEM, K-12 education, and other emerging regional workforce needs."[5]

[5] https://www.northcarolina.edu/sites/default/files/approved_definitions_goals_metrics_targets_january_2017_final.pdf

Supporting Documents:

1| Attachment 1: School of Architecture Proposed Curriculum Clarification: Percentage of Existing Curriculum that Addresses STEM Classification of Instructional Programs (CIP)

2 | Attachment 2: 2018 ACSA White Paper on Architectural Education Research and STEM

3 | AIA Press Release: Career and Technical Education bill to recognize architecture as STEM

4 | H.R.2353-Strengthening Career and Technical Education for the 21st Century Act

Attachment 1
M.Arch. Curriculum: STEM 04.0902*
January 2019

Year 1 - Fall		
ARCH 6101 Design Studio: Foundation	6	Credit Hours
ARCH 5201 History I	3	Credit Hours
ARCH 5201 Material and Assembly Principles	3	Credit Hours
ARCH 6602 Representation I	3	Credit Hours
Year 1 - Spring		
ARCH 6102 Design Studio: Foundation	6	Credit Hours
ARCH 5202 History II	3	Credit Hours
ARCH 5302 Environmental Principles	3	Credit Hours
ARCH 6603 Representation II	3	Credit Hours
Year 1 - Summer (1st Summer Session)		
ARCH 6100 Design Studio: Options	6	Credit Hours
Year 2 - Fall		
ARCH 7101 Design Studio: Building	6	Credit Hours
ARCH 5203 History III	3	Credit Hours
ARCH 5303 Structural Principles	3	Credit Hours
ARCH 5604 Computational Methods	3	Credit Hours
Year 2 - Spring		
ARCH 7103 Design Studio: Topical	6	Credit Hours
ARCH 5204 History/Theory Topic	3	Credit Hours
ARCH 5304 Structural Systems	3	Credit Hours
ARCH 5605 Computational Practice	3	Credit Hours
Year 3 - Fall		
ARCH 7102 Design Studio: Integration	6	Credit Hours
ARCH 7201 Design Methodologies	3	Credit Hours
ARCH 5305 Building Systems Integration	3	Credit Hours
ARCH 6050 Architectural Elective	3	Credit Hours
Year 3 - Spring		
ARCH 7104 Design Studio: Diploma Project	6	Credit Hours
ARCH 5206 Professional Practice	3	Credit Hours
ARCH 6050 Architectural Elective	3	Credit Hours
ARCH 6050 Architectural Elective	3	Credit Hours
Total Degree Hours	**96**	**Credit Hours**
Total STEM Hours	***57 (54.72% of the curriculum)***	

2 | Attachment 2: 2018 ACSA White Paper on Architectural Education Research and STEM

2018

ACSA White Paper on Architectural Education Research and STEM

ASSOCIATION OF COLLEGIATE
SCHOOLS OF ARCHITECTURE

White Paper on Architectural Education/Research & STEM

1. INTRODUCTION

Architecture is a diverse field that draws from multiple areas. Many architecture programs can and do include STEM-related content and a segment of architecture faculty already conduct research in STEM-related areas of interest. Taking advantage of this can offer potential to schools of architecture in both the education and research components of their mission.

The intention of this paper is to:

- Introduce STEM;
- Outline potential benefits to Architecture programs if STEM designated;
- Describe the distinction between STEM research and the Federal STEM designation given through a CIP code;
- Present survey results describing STEM in current Architecture programs; and
- Offer Case Studies and resources related to STEM; and
- Offer a position paper on Architecture and STEM.

1.1 History of STEM

The term "STEM education" refers to teaching and learning in the fields of science, technology, engineering, and mathematics. It typically includes educational activities across all grade levels—from pre-school to post-doctorate—in both formal (e.g., classrooms) and informal (e.g., afterschool programs) settings. Federal policymakers have an active and enduring interest in STEM education and the topic is frequently raised in federal science, education, workforce, national security, and immigration policy debates.

The term has been in place for decades, but gained more traction after the publication of *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future* (2007). This report prioritized ten actions that federal policy makers could implement in order to enhance the science and technology enterprise so that the United States can successfully compete, prosper, and be secure in the global community of twenty-first century. Over the past decade, funding for STEM educational programs and research activities has increased dramatically.

A proposal for the next decade of STEM education was drafted in 2015. That report develops the initial recommendations from the 2007 publication.

1.2 Audience

The audience of this paper is two-fold. It is intended to help educate faculty and administration regarding STEM designation. The paper is also intended to help educate Federal Agencies on the existing and potential STEM-related research that is ongoing in architecture programs.

2. BENEFITS OF STEM

The following sections summarize these benefits for both architectural education and architectural research. Existing barriers and risks are also identified.

2.1 OPT Extensions and Recruiting

Optional Practical Training (OPT) is temporary employment directly related to a F-1 student's major area of study. All eligible international students receive up to 12 months of OPT employment authorization to remain in the United States before or after completing their academic studies. STEM Optional Practical Training (OPT) Visa extensions Program administered by the Department of Homeland Security (DHS) can be seen as a significant benefit for recruiting international students who wish to stay and work in the US post-graduation. As of 2016, non-US students who have earned degrees in certain science, technology, engineering and math (STEM) fields, may apply for a 24-month extension of their post-completion OPT employment for a total of 36 months.

To be able to remain and work in the US for additional 24 month is very attractive for international students as it provides additional time to seek H-1B visa, a highly competitive and time consuming process which may lead to further opportunity for a green-card.

DHS maintains a complete list of fields that fall within the regulatory definition of "STEM field" that qualifies certain degrees to fulfill the extension requirement. In order to distinguish STEM from non-Stem disciplines, Department of Homeland Security adopted the pre-existing Classification of Instructional Programs (CIP) codes. The codes, used for reporting graduation rates and other program information to IPEDS, are not intended to be a regulatory device. Further information on CIP codes is in section 3 of this paper.

Currently, the STEM designated list does not include the CIP Code 04.0201: Architecture, of which most architecture related programs are filed. However, the list includes 04.0902: Architectural and Building Sciences/Technology, a new designation added to the taxonomy during the 2010 CIP code revision. Note that there is no known process to petition the inclusion of 04.0201: Architecture in the DHS's STEM Designated Degree Program list at this time.

Some architecture programs have changed their CIP code and now file under CIP code 04.0902. These programs are positioned to take advantage of STEM OPT extension. Considering the fact that most of the professional programs have been in existence long before CIP code 04.0902 was added in 2010, we speculate that they changed the CIP code from 04.0201 to 04.0902, presumably, to take advantage of the STEM OPT extension. Announcements on the program pages confirm this point. The effect of this change is yet to be analyzed. Tracking enrollment of international students before and after the CIP code change will be of interest.

A list of architecture programs with CIP code 04.0902 and link to the web pages are in the appendix section of this paper.

2.2 Research

The increased focus on STEM in research has led several funding agencies, particularly federal agencies, to develop funding programs that either give preferences to STEM-designated disciplines or in some cases are limited to those disciplines. For example, the NSF Graduate Research Fellowship Program, GRFP (NSF, 2018) is limited only to disciplines designated by NSF as STEM-related. A search of NSF funding opportunities showed more than 70 current STEM-related programs. Other agencies offering STEM-related funding opportunities include Department of Education, Department of Energy. Environmental Protection Agency, National Institutes of Health, among others. STEM-focused funding opportunities are also available through several national foundations and industry sources. Currently, architecture is not recognized as one of those disciplines. Being recognized as a STEM-discipline by funding agencies will allow architectural faculty to pursue these funding programs as well as increase their chances of success in obtaining funding in general. It will also further strengthen the potential of developing interdisciplinary collaborations in which architecture faculty play a leading role. It is worth noting that NSF designates several humanities and social sciences

fields such as urban and regional planning, anthropology, psychology, sociology, and political science, as STEM-disciplines even though these disciplines are not typically thought of as STEM-related.

Additionally, schools of architecture almost invariably include faculty who conduct STEM-focused or STEM-related research. Out of the 22 faculty research areas of interests identified by ACSA in their index of scholarship, seven directly relate to STEM research including Building Systems, Digital Fabrication, Prefabrication, Industrial + Product Design, Materials Research, Structural Design, Sustainability + High Performance Built Environment, and Prefabrication + Modular Construction. Several others offer potential for STEM-related research depending on project focus and methodology. Analysis of the survey presented in section 4 shows that STEM-related architectural research projects address all 22 research areas of interest identified by ACSA, thus illustrating the strong potential they offer for schools of architecture. All of this indicates both the need and the opportunity for ACSA to advocate for leading federal agencies to designate architecture as a STEM discipline.

2.3 Diversification

One of the key components in the development of STEM programs are the opportunities made available for under-represented groups and individuals. STEM grants are provided by the US government for Hispanic Serving Institutions (HSI), Historically Black Colleges and Universities (HBCU), as well as programs intended to support Asian American/Pacific Islanders, and Native American/American Indians. Although participation in STEM fields by minorities has grown over the past decade, they are still very much in the minority. That a majority of US High School students identify as Hispanic, means there is an opportunity for these students' participation in STEM related fields to increase dramatically.

2.4 Community College Connections

Opportunities exist for two-year and four-year collaborations, specifically dealing with articulation agreements between STEM designated programs. Also, funding opportunities and industry collaborations exist. One recent example is the project developed by Tesla and East Los Angeles College (ELAC) to develop a drone field.

2.5 Barriers and Risks

From the point of view of research, Architecture is currently not recognized by federal agencies as a STEM discipline. This limits the access of architectural researchers and schools of architecture to funding designated for STEM-related topics, as well as impacts the evaluation of proposals from architecture researchers by program officers in different agencies. To address this, ACSA should continue its efforts to engage funding agencies and have them recognize architecture as a STEM discipline.

With regard to academic programs, the general CIP code for architectural programs is currently not recognized as STEM-related. This eliminates the option for an OPT extension for graduates of these programs and could potentially negatively affect recruitment as international applicants continue to seek programs that offer this opportunity.

Two potential solutions to remedy this risk are to change the CIP codes for individual programs, or, to lobby for the Architecture CIP code to become STEM designated.

Each school has a Designated School Official (DSO) that reports program-specific CIP codes to the Integrated Postsecondary Education Data System (IPEDS). The DSO also works with the Student Exchange Visiting Program (SEVP) to coordinate with foreign students requesting OPT extensions. Schools can change the CIP code for individuals as well as programs in the Student and Exchange Visitor Information System (SEVIS). The SEVP, however, cautions programs when doing so to make the change program-wide so that it applies to all students and be sure to document the curricular changes made to justify the CIP code change.

3. CLASSIFICATION OF INSTRUCTIONAL PROGRAMS (CIP) CODES

The intent of this section is to provide an overview of applicable CIP codes for various architecture programs, clarify the relationship between CIP codes and Department of Homeland Security's STEM Designated Degree Program List and to outline a path for CIP code change.

3.1 Definition of Classification of Instructional Programs (CIP) Codes

The Classification of Instructional Programs (CIP) provides a taxonomic scheme that supports the accurate tracking and reporting of fields of study and program completions activity. CIP was originally developed by the U.S. Department of Education's National Center for Education Statistics (NCES) in 1980 with revisions occurring in 1985, 1990, 2000, and 2010.

The CIP is the accepted federal government statistical standard on instructional program classifications and is used in a variety of education information surveys and databases. Since it was first published in 1980, the CIP has been used by NCES in the Integrated Postsecondary Education Data System (IPEDS) and its predecessor, the Higher Education General Information Survey (HEGIS) to code degree completions. It is also used by other Department of Education offices, such as the Office for Civil Rights, the Office of Vocational and Adult Education, and the Office of Special Education, and serves as the standard on instructional programs for other federal agencies, including the National Science Foundation (NSF), the Department of Commerce (Bureau of the Census), the Department of Labor (Bureau of Labor Statistics), and others. The CIP is used by state agencies, national associations, academic institutions, and employment counseling services for collecting, reporting, and analyzing instructional program data.

The CIP titles and program descriptions are intended to be generic categories into which program completions data can be placed, not exact duplicates of a specific major or field of study titles used by individual institutions. CIP codes are standard statistical coding tools that reflect current practice, and are not a prescriptive list of officially recognized or permitted programs. The CIP is not intended to be a regulatory device. CIP codes, for the most part, are not intended to correspond exclusively to any specific degree or program level. In most cases, any given instructional program may be offered at various levels, and CIP codes are intended to capture all such data.

The vast majority of CIP titles, however, correspond to academic and occupational instructional programs offered for credit at the postsecondary level. These programs result in recognized completion points and awards, including degrees, certificates, and other formal awards.

3.2 CIP Codes in Architecture

Most architecture related programs are filed under primary 2 digit CIP Code 04 - Architecture and Related Services, defined as "Instructional programs that prepare individuals for professional practice in the various architecture-related fields and focus on the study of related aesthetic and socioeconomic aspects of the built environment."

The ten sub-categories are;
04.0201: Architecture
04.0301: City/Urban, Community and Regional Planning
04.0401: Environmental Design/Architecture
04.0501: Interior Architecture
04.0601: Landscape Architecture
04.0801: Architectural History and Criticism, General
04.0901: Architectural Technology/Technician
04.0902: Architectural and Building Sciences/Technology
04.1001: Real Estate Development
04.9999: Architecture and Related Services, Other

See Figure 1 for the distribution of programs per CIP code. Note that the chart is based on the publicly available NCES/IPEDS 2015-16 data online. It includes all post-secondary education programs and non-accredited programs. The data is not tied to the exact duplicates of a specific major or field of study titles used by individual institutions.

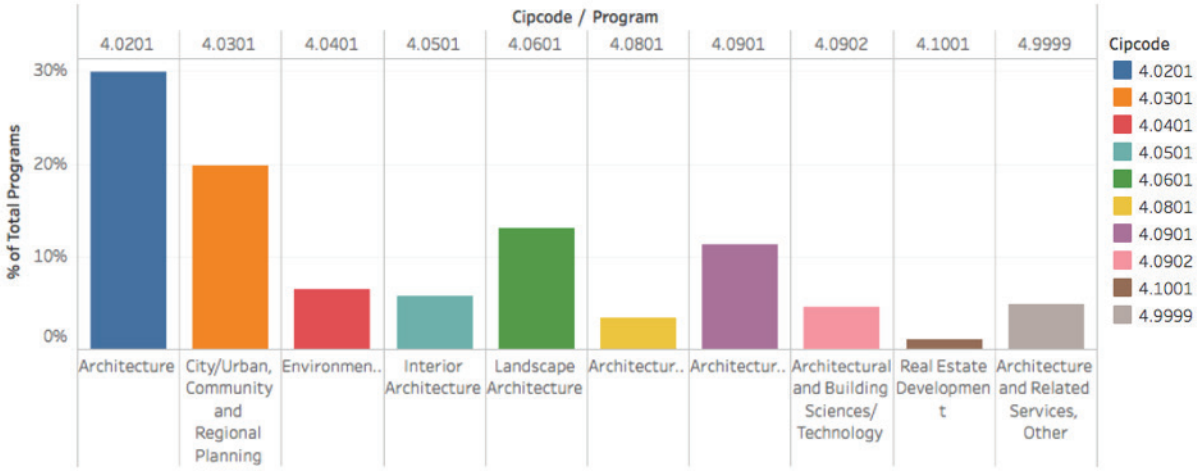


Figure 1
Distribution of architecture related programs as per CIP Code.

Figure 2 excludes Planning, Landscape Design, Interior Design, Real Estate and Other related services as well as vocational training represented in the 04.0901: Architectural Technology/ Technician to focus on the distribution of professional, pre-professional and architecture programs per CIP code.

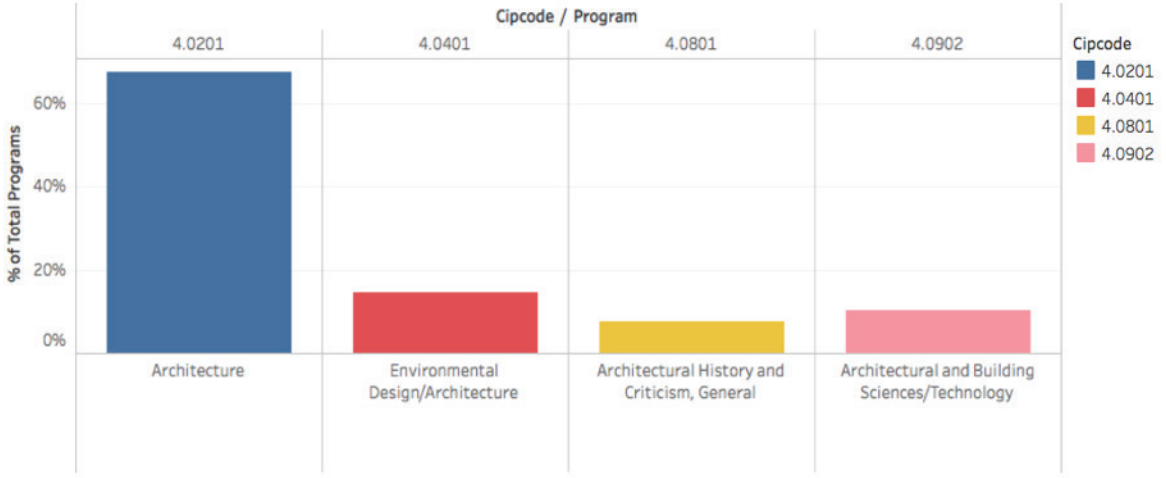


Figure 2
Distribution of Architecture programs (accredited and non-accredited) per CIP Code.

A quick comparison of individual data samples against degree programs offered at the universities reveals that many B. Sci. Env. Des. type programs are filed under CIP code 04.0401. History /Theory focused Bachelors, Masters and Ph.D. programs are filed under CIP code 04.0801.

Many recently established post-professional Master of Science programs focused on computation, building performance and sustainable technology are filed under 04.0902: Architectural and Building Sciences/Technology. There are more than half a dozen professional M. Arch. programs and a few pre-professional undergraduate architecture degrees are under this category.

IPEDS data do not track what degree program is filed under which CIP code. As stated earlier, the CIP titles and program descriptions are intended to be generic categories into which program completions data can be placed, not exact duplicates of a specific major or field of study titles used by individual institutions. Thus, the general interpretation of the data presented here relies on the comparison between IPEDS data which reveals how many programs are field under certain CIP code per institution and the program information available on the web. The committee recommends ACSA to conduct a member-schools survey on which program is filed under what CIP code. It may also be beneficial for NAAB to include CIP codes in the Annual Report Submission that schools of architecture are required to complete.

3.3 Navigating CIP Changes

As stated in the previous section, in order for the international students graduating from the architecture related program to be eligible for STEM OPT extension, the CIP code must be 04.0902: Architectural and Building Sciences/Technology. Thus, if you seek to make your program eligible for the privilege, you either change the CIP code to 04.0902 or to transition into a "new program" with the CIP code 04.0902.

Institutions are responsible for assigning and maintaining the CIP codes for IPEDS and other data collection and reporting duties. When establishing a new major or degree program, proposing the proper CIP code is often the program director or department chair's charge. The new program proposal will then go through the standard approval process unique to the institution, including the review of the proposed CIP code. Generally, the chief academic officer (the University Provost) of the institution have the authority in approving the initial CIP code.

The process for CIP code change varies amongst the institutions. For private institutions, it may be as simple as a review and approval by the University Registrar and/or the Chief Academic Officer. Some institutions maintain an ad-hoc review committee with appropriate representations such as the University Registrar, Office of Academic Affairs, Associate Deans from Schools/Colleges. The committee may consult with other service units within the institution such as the Office of Institutional Technology, International Students and Scholars and Financial Aid to take short-term and long term impact of the change into account.

In the case of Public Institutions, State Board of Higher Education may have the authority in approval as the CIP codes are often tied to the state reporting responsibilities as well as state funding schemes. STEM programs are funded at a significantly higher level then Humanity programs, another reason for architecture programs to be considered for STEM designation. In certain cases, from the perspective of approval process, it may be less onerous to simply propose a new program with the preferred CIP code as opposed to changing them for the already established program.

Once the CIP code change is approved, it is effective immediately to all students enrolled in the program.

3.4 Grounds for the CIP Code Change

The following points may be useful in arguing for the CIP code change (from CIP code 04.0201: Architecture to CIP code 04.0902: Architectural and Building Sciences/Technology) for NAAB accredited Professional M. Arch. and B. Arch. programs.

3.4.1 The CIP code change will not affect the current nor future accreditation status. National Architecture Accrediting Board (NAAB) states that the NAAB Conditions for Accreditation do not require programs to operate under a specific CIP code.

1.1.2 Instructions in Building Sciences and Technology addressing the proficiency in the area of civil and structural engineering, mechanical engineering, computational tools are a significant part of the architecture curriculum reflecting the NAAB Student Performance Criteria. Generally, a third of the required courses (in credit hours) are building science and technology related, equivalent to the design instruction courses in NAAB accredited professional programs. Program definition for CIP code 04.0902 annotated with the corresponding NAAB SPC is in the appendix section of this paper.

1.1.3 Example of peer and aspirational programs who has already made the change.

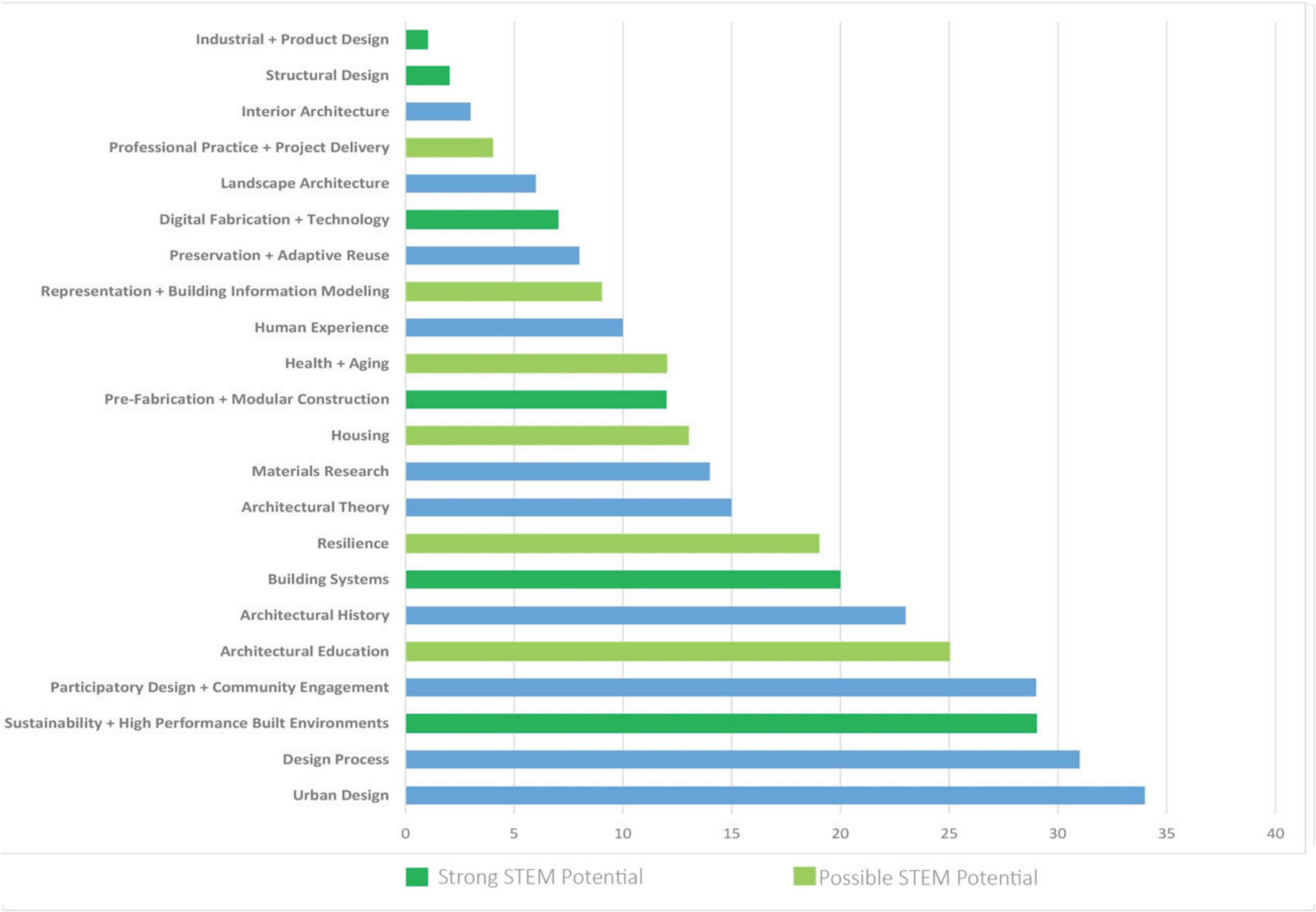
4.0 ARCHITECTURAL RESEARCH AND STEM: SURVEY RESULTS

In Fall 2017, the ACSA Research + Scholarship Committee conducted a survey of externally-funded projects in schools of architecture. External funding could include national, state or local grants, as well as industry partnerships, but defined as coming from outside one's home university system. Faculty and administrators from all ACSA member schools were invited to participate with information regarding projects from the last three academic years (2014-15, 2015-16, and 2016-17). This survey yielded 110 responses from faculty at ACSA member schools with 207 projects represented and 37% of the participants listing multiple projects. Upon examining the responses, 21 projects were excluded either because they only listed internal sources of funding or did not list any funding sources. The remaining 186 projects from 101 faculty were analyzed and the results are discussed below.

Out of the 186 submitted projects, 55%, 102 projects, self-identified as interdisciplinary in nature. The participants' titles ranged from Adjunct to Dean. Associate Professor was the most frequent (34), with Professor (29) next, and finally Assistant Professor (22). The respondents were 33.6% female and 66.4% male. The participants represented 62 different institutions, with 35 (56%) being recognized by Carnegie Classifications as "R1: Doctoral Universities – Highest research activity." With a membership of over 5000 faculty members and 200-member schools with 56 being R1 institutions.

Respondents were asked to identify up to three research areas of interests for themselves. However, 26 of the 101 respondents identified more than 3 areas with a maximum of 9 areas identified by two respondents. Research areas options were based on the classification used for the ACSA Index of Scholarship. Areas of research interest identified most by the survey respondents include Urban Design (34), Design Process (31), and Sustainability + High Performance (29). In all, 50 out of the 101 respondents self-identified as having at least one research area of interest with strong STEM potential. Figure 3 includes a listing of all research areas and the number of respondents who self-identified with it.

Figure 3
Faculty Research Areas of Interest



It needs to be noted that the responses received from the survey cannot be considered a representative sample. What is presented here and the corresponding conclusions are based only on the data received and not able to be generalized to the larger architectural academic profession. However, the survey respondents demonstrate that architectural researchers are conducting funded research and architectural research projects are being awarded grants by the top governmental and private foundation funders in addition to local and state partners. The 101 respondents have reported more than $33,575,000 in funding, with eight projects not reporting a specific funding amount.

Since the intent of this white paper is to examine STEM research in architecture, and in particular those funded by external agencies, following the analysis above, the responses were filtered to STEM-related projects only, based on faculty self-identification as well as an analysis by the authors. As will be described in more depth below, these two characteristics were used to narrow the responses to a pool of 91 projects from 52 faculty members. These faculty members represent 36 institutions with 24 (67%) being classified as R1. These projects represented approximately $23,930,000 of external funding, or 71.3% of the total funding amount reported by the survey respondents. The analysis that follows is based on those survey results that meet this classification.

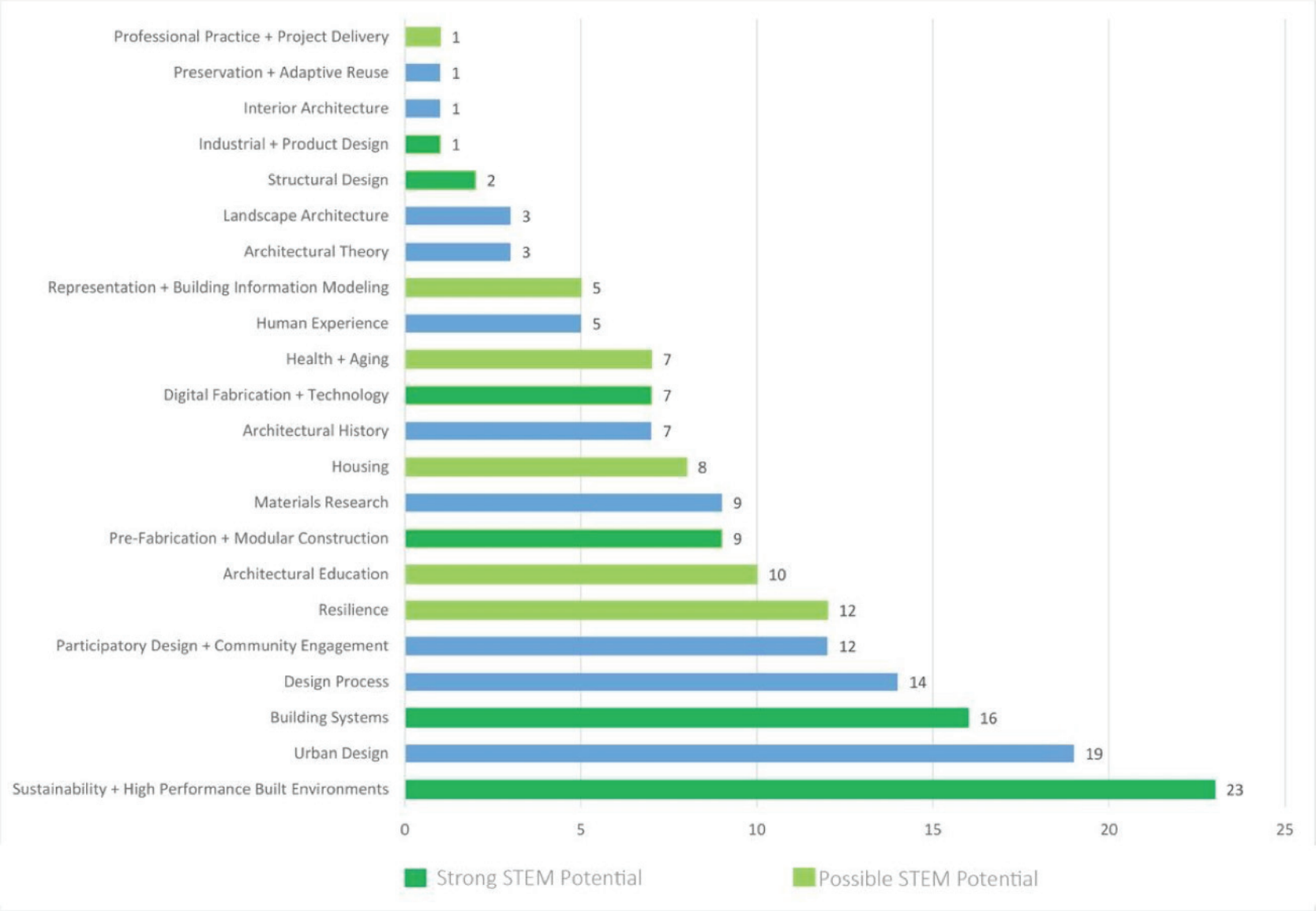
4.1 STEM / Non-STEM

The identification of STEM-related projects was based on both respondent self-identification as well as an analysis of the project title, project research areas, and project abstracts. Out of the 91 projects identified in this analysis as STEM-related, 72 were self-identified as such, 16 were identified by the respondents as non-STEM and reclassified by the authors as STEM-related, and 3 that were not classified by the respondents. The reclassification was based on the federal definitions of STEM-related research areas. The relatively large number of projects not identified as STEM-related by the respondents when they do offer this potential may indicate a need to clearly define the term STEM to architecture faculty and to find methods of addressing any potential apprehensions architecture faculty may have against describing their work as STEM-related.

4.2 Research Areas of Funded STEM Projects

Survey respondents were asked to identify up to three research areas for each project. Research areas identified the most for the STEM-related projects were Sustainability and High Performance (23), Urban Design (19), and Building Systems (16). However, each of the 22 possible research areas were identified at least once including design process (13), architectural history (7), and architectural theory (3). This indicates that STEM-related projects could offer potential beyond the traditional areas typically associated with them. Figure 4 provides a listing of the research areas and the number of projects that are included.

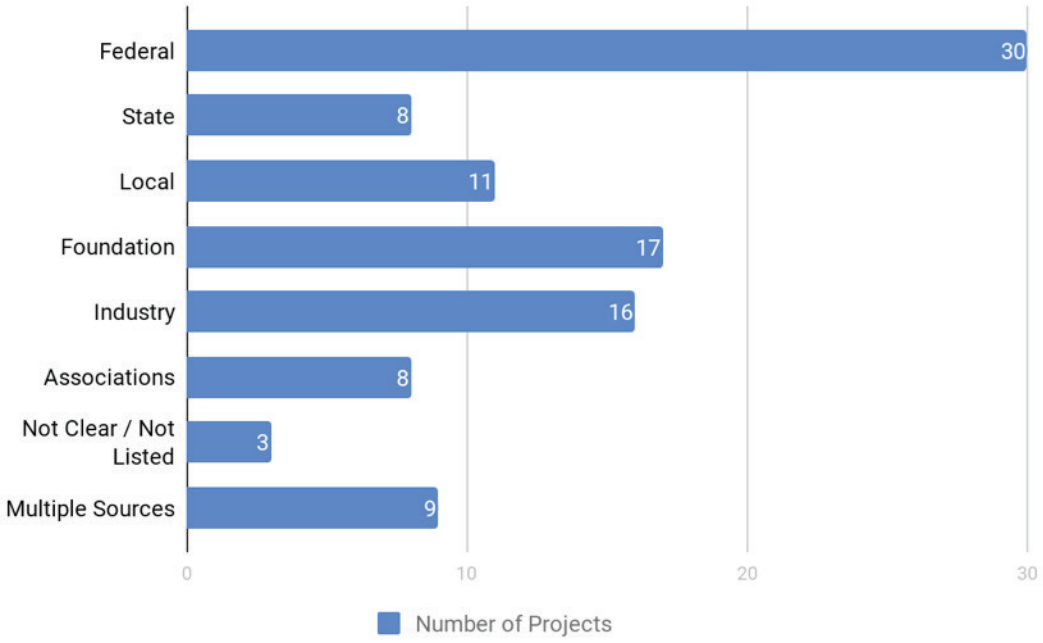
Figure 4
STEM-Related Projects Research Areas



4.3 Funding Sources for STEM Projects

With regard to funding sources, the survey showed that STEM-related architectural research projects receive funding from a wide range of funding sources including federal agencies, foundations, associations, industry, and well as state and local sources. Figure x shows the number of projects which received funding from each category of funding sources. Thirty projects (33%) received funding from federal agencies, including 25 from federal agencies in North America. Funding from federal agencies in North America totaled approximately $10,000,000. Out of those, 13 projects were funded by the National Science Foundation (NSF) with a total funding of $4,300,000. Other Federal sources included NIH, NPS, the US Dept. of the Navy, US DOE, US DOT, and The Social Sciences and Humanities Research Council of Canada. Foundations such as the Alfred P. Sloan Foundation, the Auerbach Theater Architecture Fund, Graham Foundation, and others were listed as the second most common source of funding with 19% (17) of the projects noting these. Industry grants from Autodesk and Ford Motor Company and grants from Associations such as the AIA were other notable contributors for research funds. A variety of state and local sources were also listed in 19 of the projects.

Figure 6
STEM Related Projects Sources of Funding

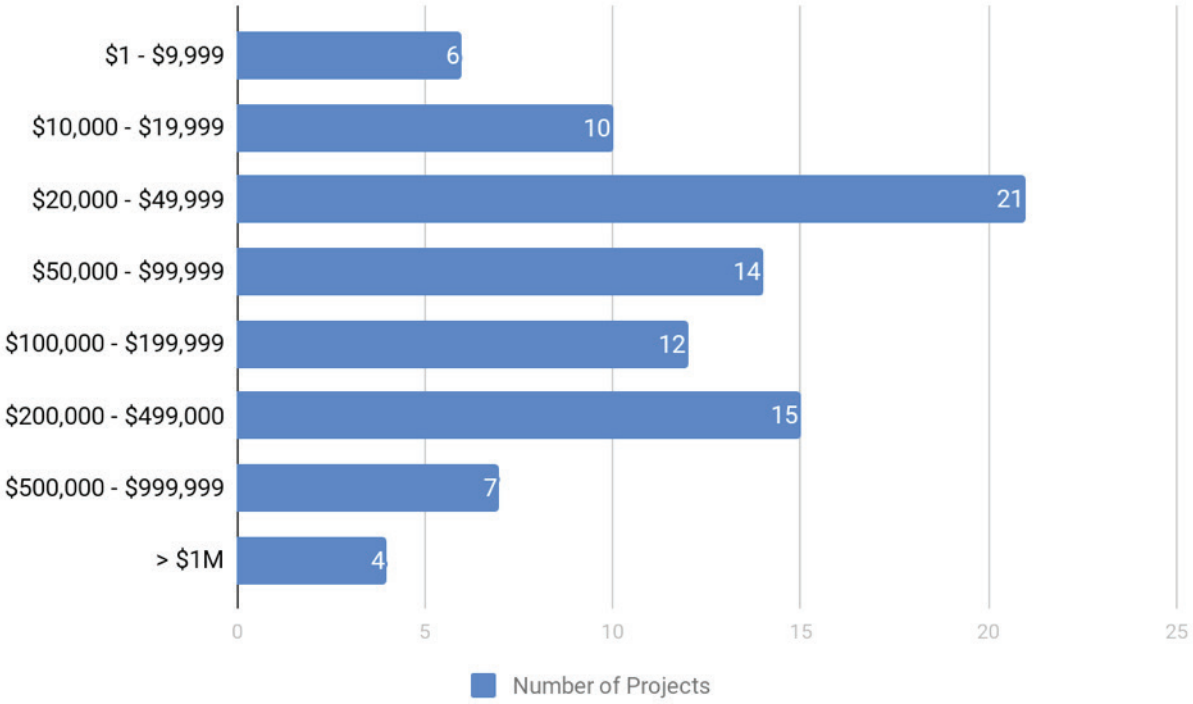


4.4 Classification of Project by Funding Levels

Analysis of the funding amounts received by the STEM-related research projects showed that the most common level of funding is between $20,000 and $49,999, with 24% (21) of the projects receiving funding at this level. While this level of funding was most common, between 12 and 15 projects also received funding in each of the three funding levels that follow ($50,000 - $99,999), ($100,000 - $199,999), and ($200,000 - $499,999). It is noteworthy that 7 projects received funding between $500,000 and $1 million and another 4% (4) projects received over $1 million in funding each. Figure x shows the distribution of the projects by funding level. Two projects did not specify a funding amount.

The majority of these projects list only a single source of funding as contributing to the reported amount. As such, it cannot be determined whether any prior seed funding had been received from internal university grant sources. In the case of 9 STEM related projects, multiple sources of funding comprise the reported amount including external and internal sources.

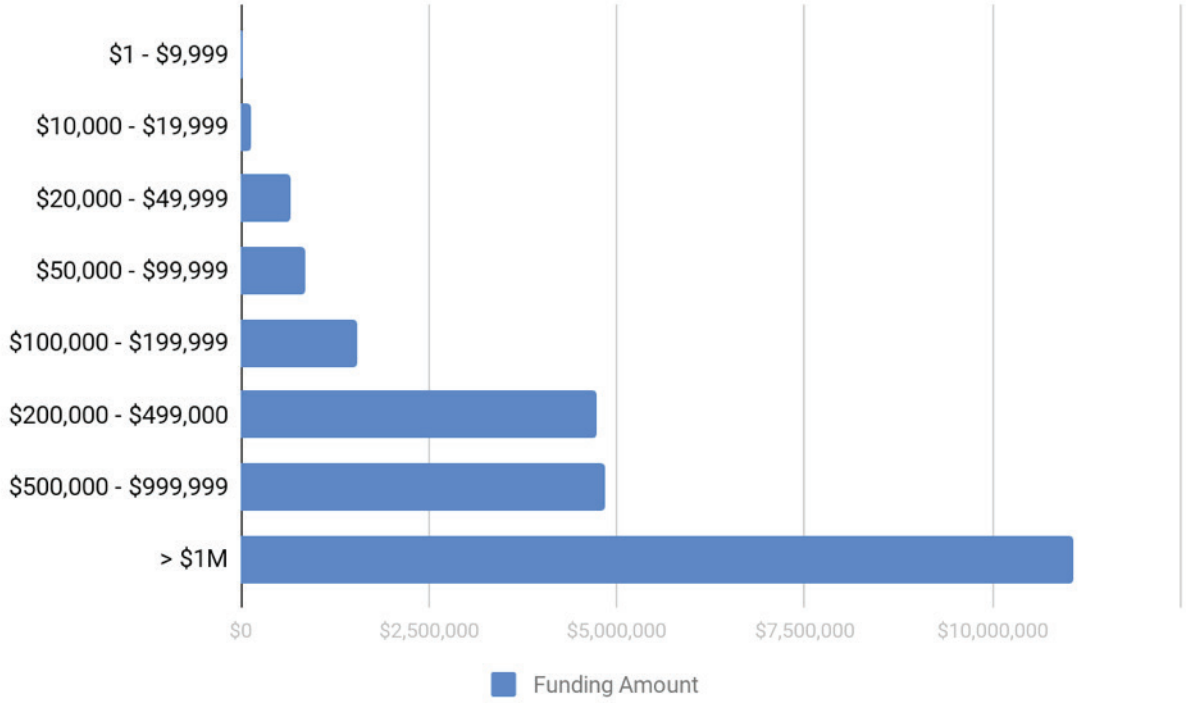
Figure 7
Number of STEM Projects by Level of Funding



The greatest amounts of funding were granted primarily by Federal sources and corporate / anonymous donations. Single projects in receipt of more than $1 million received funds from the US DOE and NIH, respectively, and also through combined funding from EPA, NEA, Sloan Foundation, and other sources. A number of NSF grants as single sources of project funding were also awarded within the funding levels of $500K - $1M and $200K - $499K.

Other major sources of funding included the Social Sciences and Humanities Research Council of Canada, Ford Motor Company, W.M. Keck Foundation, Charles Pankow Foundation, the BM-M Barr Foundation, the WK Kellogg Foundation, and local state and city agencies. While larger projects ($200,000 and above) only constitute only 29% (26) of the STEM-related projected reported in the survey, they represent 86% of the total funding amount as shown in figure x, with a total funding of $20.65M. This indicates the potential offered by STEM-related projects in obtaining large funding sources for schools of architecture. It is worth noting that only 10 externally funded projects not identified as STEM-related fall into this funding category, with a total funding of approximately $6M. Therefore, STEM-related research projects in the survey were considerably more successful in receiving larger numbers and amounts of funding.

Figure 7
STEM-Related Projects Funding Amounts by Funding Level



4.5 Interdisciplinary Research and Research Partners

Participants in this study have demonstrated a strong potential of architectural contributions to research in a wide range of topics ranging from engineering and science on the one hand to arts and humanities on the other. Out of the 91 STEM-related projects, 59 self-identified as interdisciplinary projects, representing almost 65% of the projects submitted. The issue of the role of architecture and architectural; researchers in interdisciplinary projects was also explored. Out of the 59 self-identified interdisciplinary projects, 39 projects were identified as architecture-led, and an additional 10 as architecture-supporting. An analysis of the other disciplines identified in the survey indicates that engineering offers the most potential for interdisciplinary collaboration with 29 projects. Other notable partner disciplines include Biology (7), Urban Planning (6), landscape Architecture (6), and Material Science, Computer Science, and Public Administration (5 each). In total, 47 disciplines were listed as partners. A listing of all these disciplines is included in Figure 8.

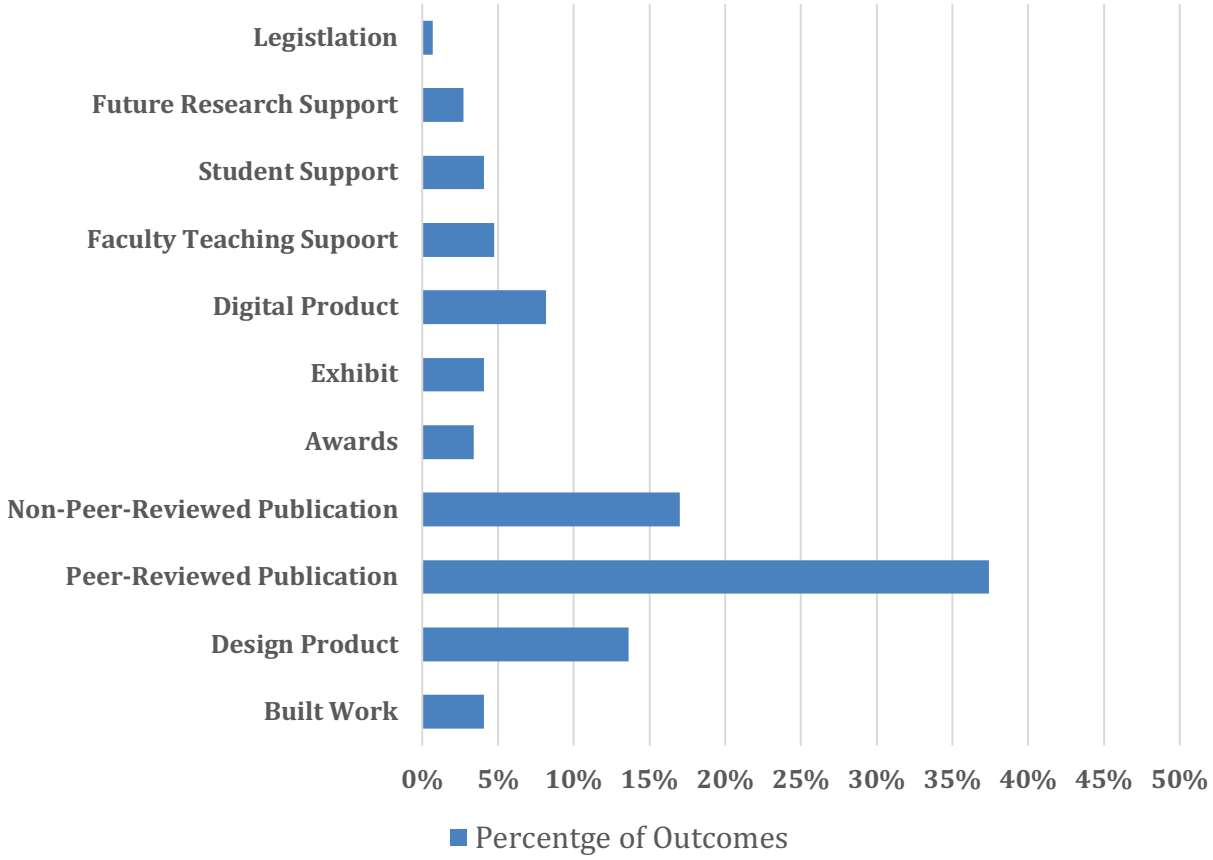
Figure 8
Disciplinary Partners for Architectural Researchers

Disciplinary Partners of Architectural Researchers	
Advanced Manufacturing	Industrial Design
Aquatic Ecology	Information Studies
Architectural Engineering	Interior Design
Art	Material Science
Arts Management	Mechanical Engineering
Behavioral Sciences	Medicine, Health Professionals
Biological and Agricultural Engineering	Landscape Architecture
Biology	Law
Building Science	Library Science
Business	Media Studies
Civil Engineering	Power Engineering
Computer Science	Public Administration
Construction Science	Public Health
Cultural Studies	Public Policy
Drama	Sociology
Ecology	Spatial Sciences
Education	Statistics
Electrical & Computer Engineering	Structural Engineering
Environmental Sciences	Systems Engineering
Geography	Textiles/Textile Engineering
German Studies	Transportation Planning
History	Urban Planning
History of Science	Wood Science
History of Technology	

4.6 Reported Outcomes of Research Projects

The reported and expected outcomes for architectural STEM research projects are education-based, publication-focused, or relate directly to the work of architects. Funding was given for student scholarships, post-doctoral fellowships, and to create other support structures for students. Participants were funded to write courses, to sponsor a studio, or for completion of design-build projects. Teaching and research laboratories were supported as was travel for graduate students to conferences and the hiring of student researchers. Dissemination of research came through conference papers, articles, and book publication. Research reports or design guidelines were frequent outcomes with exhibitions, software development, and building documentation as other types of products. Prototypes, proof-of-concept models, or material testing start to demonstrate more architectural forms of research results. Research was also incorporated into the building prototype designs and plans of urban environments. Culminating events including a research symposium and community outreach workshops. Notably, some architectural researchers were able to construct buildings that incorporated research findings or design guides. Respondents listed awards they had won for their design work, built or conceptual, alongside articles about this same work. An analysis of the outcomes reported in the survey responses is included in figure 9 below.

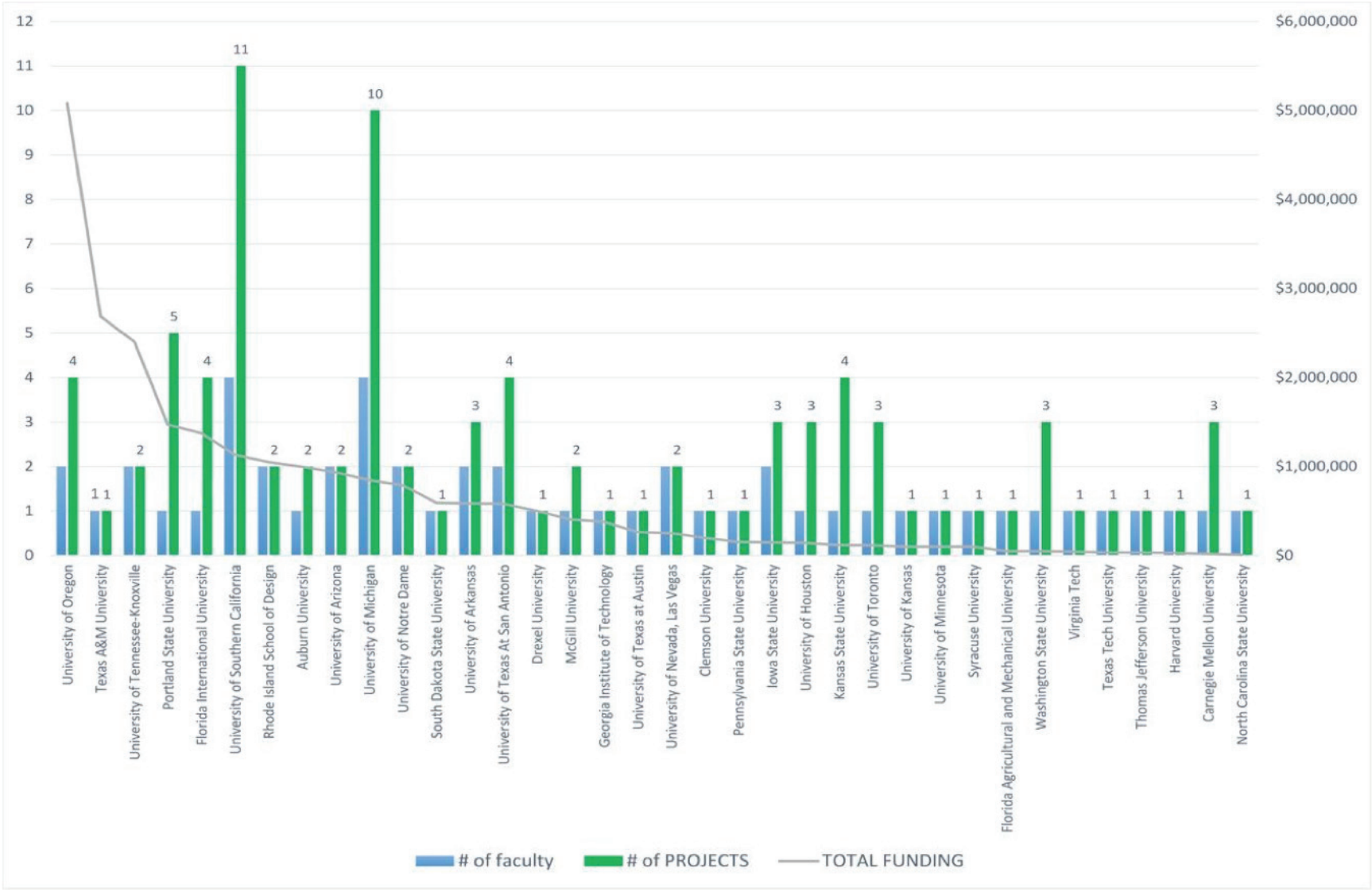
Figure 9
Analysis of Reported Outcomes for STEM-Related Research Project



4.7 Relationship between STEM Designated Architectural Academic Programs and Research Funding

While faculty from all of the universities listed in Figure 9 reported projects that were STEM related, only seven of those universities have programs filed under CIP code 04.0902. In fact, none of the institutions reporting funding which totaled more than $1 million have STEM designated architectural academic programs. As it is not yet adopted widely by architectural institutions, it remains to be seen whether STEM designations for architectural academic programs will lead to greater research funding amounts or vice versa. With many granting organizations and federal agencies demonstrating a preference for STEM related research, official STEM program designations can only be seen as advantageous. it is worth noting that adopting CIP code 04.0902 is program specific and therefore does not necessarily indicate a STEM-designation for all academic programs in a school. Nor does it indicate a specific STEM focus for the that school. It could however be indicative that the topic of STEM is being actively discussed or considered within a school. As Figure 10 also shows, a stronger correlation seems to exist in the sample analyzed between STEM-related externally-funded projects and the research designation of the university, with 25 of the 37 schools of architecture which reported funding from STEM-related projects located in R1 universities.

Figure 10
Total Funding awarded per Institution with faculty reporting STEM-related projects



4.8 Survey Conclusions

The following summarizes the major conclusions that can be drawn from the survey responses received. It is worth noting again that these conclusions are only based on the responses received (101 faculty reporting on 186 projects, representing 62 institutions). However, the size of sample is sufficiently large to make some preliminary conclusions and indicate possible trends in the larger architectural academic community.

Analysis of the survey results indicates that STEM-related externally funded architectural research projects represent a significant portion of the larger population of externally-funded architectural research projects in terms of numbers, 91 out of 186 or 49%, and much more so in terms of funding amount, $23.9M out of a total of $33.6M or 71.3%. STEM-related projects also appear to be more successful in receiving funding from federal agencies, with 30 STEM-related projects receiving funds from these sources compared to only 10 from non-STEM-Related ones. Furthermore, STEM-Related projects also appear to be more successful in obtaining larger funding amounts with 29 of these projects receiving funding at the $200,000 or above level totaling $20.65M or 86% of the total funding received by STEM-related projects. In comparison, only 6 non-STEM projects received funding at this level with a total funding of approximately $6M. This indicates that STEM-related projects can offer strong potential for schools of architecture in securing more and larger externally-funded projects.

The survey indicated that STEM-related projects are typically not limited to the conventional, technically oriented, areas. In fact, STEM-related projects included in this analysis addressed all research areas of interests identified in the ACSA Index of Scholarship. Similarly, faculty reporting STEM-related projects have self-identified as having a wide range of research areas of interest including both STEM-related and non-STEM areas. Both of these observations indicate that STEM-related research funding can support both STEM and non-STEM faculty and research areas. Additionally, STEM-related projects reported a relatively high percentage of interdisciplinary collaboration with a very wide range of disciplines not only from scientific fields but also from the humanities, social sciences and arts. This adds to the potential that STEM-related projects can offer to schools of architecture.

Finally, the survey results suggest that while there are some significant sources of funding available for non-STEM related projects related to large scale planning, housing, and community development, faculty seeking such grants for this and other scales of work may benefit from collaborating with other STEM disciplines, while maintaining an architectural focus in the research. It is also clear from the survey results that architectural faculty in a number of ACSA member schools have, in fact, been awarded a fair amount of high level grants in recent years, despite the common belief that the architectural discipline in academia lags behind other STEM disciplines in yielding research dollars to their institutions. Architecture, as a discipline, is well poised to emerge as a leader in a number of research areas moving forward. Having this level of achievement on the part of architectural faculty and schools become more recognized by funding agencies, especially federal ones, will further increase their potential and the benefits they can offer to schools of architecture and to the architectural academic community in general. ACSA may be the best organization to attempt to establish such a level of recognition.

5. CASE STUDIES OF STEM FUNDING IN ARCHITECTURAL RESEARCH

This section will highlight individual grants to show where opportunities exist for other architecture faculty members to obtain funding for STEM-related architectural research. The case studies presented here represent a range of possible project types and funding sources. They also include both direct research funding as well as funding for studio-based design research activities and scholarships.

5.1 Funding for Architectural Research

5.1.1 Development of an Integrated Analytical Framework for Urban Sustainability

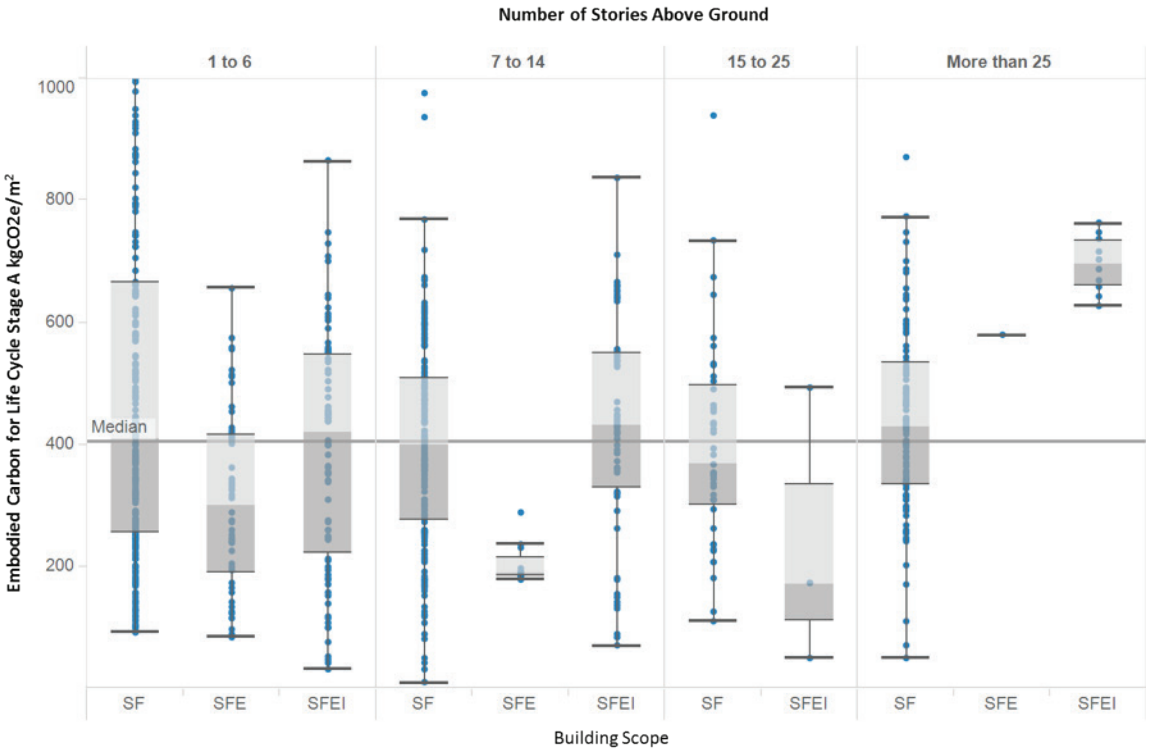
image credit: Nabila Iqbal

PI: Simi Hoque, PhD, PE
Location: University of Massachusetts, Amherst (now at Drexel University)
Funding source: National Science Foundation, Faculty Early Career Development Program (CAREER)
Amount: $508,000

At the time she received this grant, Dr. Hoque was an Assistant Professor in the Department of Environmental Conservation and is now an Associate Professor in Architectural Engineering at Drexel University. With a PhD in Architecture, M.Arch. and M.S. in Civil Engineering, she is using her CAREER grant to develop an Integrated Urban Metabolism Analytical Tool (IUMAT) to evaluate and predict the impacts of energy and water use, land use, and transportation systems at an urban scale. IUMAT is designed to systematically quantify aggregate impacts in terms of performance metrics, such as GHG emissions and energy use. NSF's CAREER program supports junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research in the context of the mission of their organizations and is highly sought after by junior faculty in STEM disciplines. While the CAREER program requires the recipients to have a PhD and hold a tenure-track, Assistant Professor position, Dr. Hoque demonstrates that an architecture research topic aligned with an NSF program, in her case Environmental Sustainability, can lead to a CAREER grant.

For more information about this grant:
https://www.nsf.gov/awardsearch/showAward?AWD_ID=1554531

5.1.2 Life Cycle Assessment (LCA) for Low Carbon Construction



Embodied carbon per m^2 according to number of building stories above ground, subdivided by each LCA building scope data subset; SF = Structure and Foundation; SFE = Structure, Foundation, and Enclosure; SFEI = Structure, Foundation, Enclosure, and Interiors. (image credit: Kathrina Simonen)

PI: Kathrina Simonen, AIA, SE
Location: University of Washington, Carbon Leadership Forum
Funding source: Charles Pankow Foundation
Amount: $150,000

This project provides guidance to industry professionals looking to integrate carbon into life cycle based decision making through the creation of an environmental life cycle assessment (LCA) practice guide and establishment of embodied carbon benchmarks of buildings. This practice guide will focus on aiding carbon reduction in the building construction sector (both new construction and renovation) through the use of whole building LCA. The guide will integrate concurrent work developed by others into one common practice guide document. An interactive visualization of the embodied Carbon Benchmark results and LCA Practice Guide (draft) are available on the Carbon Leadership Forum website.

For more information about this grant: http://www.pankowfoundation.org/grants.cfm

5.1.3 Reflective Roofing Research

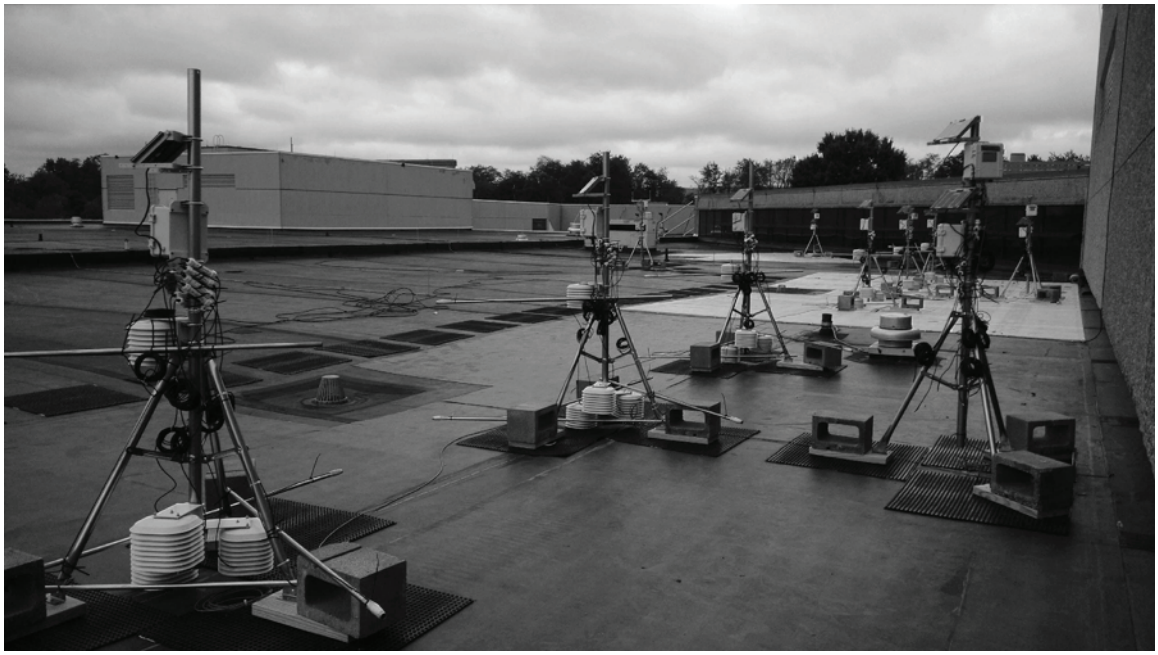


image credit: Elizabeth Grant

Co-PI: Elizabeth Grant, Ph.D., RA
Location: Virginia Polytechnic Institute and State University
Funding source: RCI Foundation
Amount: $45,000

The design of a roof system has important ramifications beyond the performance of the roof itself. There have been a number of recent papers indicating that white roofs may not create lower temperatures than other types of roofing at areas surrounding the roof surface. To help answer emerging questions about the thermal effects of roof color on the neighboring built environment, a research project was conducted by the Center for High Performance Environments at Virginia Tech with the support of the RCI Foundation. Temperatures were recorded at the surface of black ethylene propylene diene monomer (EPDM) and white thermoplastic polyolefin (TPO) membrane overlay areas; in the air and at electrical metallic tubing (EMT) above them; and at opaque and glazed wall surfaces adjacent to them. The surface of the EPDM roof was significantly hotter than the TPO roof by 36°C and 26°C on two test dates. Air temperatures were 2°C higher above EPDM versus TPO up to 14 cm, with no significant differences above this height. Temperatures were 2°C higher at EMT above the TPO surface than above the EPDM. A precast concrete panel wall was 3–5°C warmer adjacent to TPO versus EPDM. Exterior glazing surface temperatures were 2°C warmer adjacent to TPO versus EPDM. The study contributes to the literature by offering experimental data useful to researchers seeking to anticipate the thermal effects of roof systems. The results are also of interest to practitioners curious about these impacts.

For more information about this research: https://vtnews.vt.edu/articles/2017/10/CAUS-Black-White-Roofing.html and "The influence of roof reflectivity on adjacent air and surface temperatures."

For more information about this funding source: http://www.rcifoundation.org/

5.1.4 Life-cycle Assessment of Resiliency and Sustainability of Buildings

image credit: Aimee Buccellato

Co-PI: Aimee Buccellato
Location: University of Notre Dame
Funding source: National Science Foundation, Structural and Architectural Engineering Program (now Engineering for Civil Infrastructure Program)
Amount: $398,883

In this interdisciplinary grant, Professor Buccellato serves as a Co-PI with her colleague in Civil Engineering serving as the PI. Their project will develop an integrated life-cycle assessment capturing the dependencies between multi-hazard resilience and sustainability, across the multiple contributing dimensions of environmental impact. The computationally efficient assessment will take advantage of (i) simulation-driven approaches, (ii) sample-based tools, (iii) soft-computing techniques, and (iv) new environmental impact toolsets that will mine publically available data to quantify the building's operational and embodied energy. Through sensitivity analyses on actual buildings, the framework will reveal which design aspects truly drive environmental impact and how this is affected by the consideration of lifetime exposure. The transfer of this newfound understanding is further facilitated by engaging practicing engineers and architects directly in the research effort. As the NSF values the broader impact of the proposed research as much as the intellectual merit, architecture faculty members can contribute significantly to expanding and explaining the broader impact of engineering research focused on buildings.

For more information about this grant: https://www.nsf.gov/awardsearch/showAward?AWD_ID=1537652

5.2 STEM Funding for Architectural Education

While the majority of STEM funding reported in the survey was related to research, there was funding recorded for architectural education including design studio research and NSF scholarship programs.

5.2.1 Lane County Courthouse Mass Timber Studio

image credit: Spencer Boragine, David Moreno, Josh Rosenthal, Zachary Sherrod, students; Professor Judith Sheine and Associate Professor Mark Donofrio, instructors

PI: Judith Sheine
Co-PI: Mark Donofrio
Location: University of Oregon
Funding source: Lane County, Oregon
Amount: $50,000

Five student projects that explored the design of a new courthouse using mass timber structural systems and sustainable principles were presented to the County. These student projects will be used to inform the public and the RFP process about the possibilities of designing with mass timber.

For more information about this similar research studios:
http://tallwoodinstitute.org/mass-timber-design-studios

5.2.2 NSF S-STEM Program

The NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) Program provides funding for scholarships to 1) increase the number of low-income academically talented students with demonstrated financial need obtaining degrees in STEM and entering the workforce or graduate programs in STEM; 2) improve the education of future scientists, engineers, and technicians, with a focus on academically talented low-income students; and 3) generate knowledge to advance understanding of how factors or evidence-based curricular and co-curricular activities affect the success, retention, transfer, academic/career pathways, and graduation in STEM of low-income students. There are currently three active NSF S-STEM grants related to building science totaling over $1.7M. These include the Green Building Scholars Program at Portland State University (NSF Grant No. 1356679), the Sustainable Building Science Technology program at South Seattle Community College (NSF Grant No. 1406320), and the Augmented Reality and Collaborative Problem-Solving for Building Sciences project between Florida International University, University of Arkansas, and Missouri State University (NSF Grant No.1504898).

APPENDICES

Appendix A

ACSA Statement of Support for Architectural STEM Researchers

The Association of Collegiate Schools of Architecture (ACSA) is a nonprofit association of over 200 member schools. These include all accredited architecture degree programs in institutions of higher education in the United States, as well as government-sanctioned schools in Canada. Through this membership, over 5,000 faculty members in architecture and allied disciplines are represented. Serving as the voice of architectural educators, ACSA is the forum for ideas and issues that will affect architectural education and practice, design and building industry research, policy development, and liaison with allied professionals.

The Board of Directors of the ACSA respectfully asks federal and state governments, funding agencies and foundations to include Architecture as a discipline in their consideration of the Science, Technology, Engineering and Math (STEM) fields. Architectural education includes the study and application of building science, mechanical engineering, structural engineering, and building construction technology to the design of buildings. This breadth of STEM content in our discipline is necessary as architects lead multidisciplinary teams of designers, engineers and consultants to efficiently integrate building systems and improve the public health and welfare.

Architecture is also critical to STEM-related research that has far reaching impacts on our society beyond the design and construction of buildings. Architectural faculty are addressing energy, public policy, resiliency, and urban design through utilizing robust scientific and engineering knowledge and methods in their research projects. Green building strategies and materials research are tested in university-led laboratory simulations or post-occupancy analysis of cutting edge buildings. STEM-based architectural research is vital to improving the quality of the built environment, reducing energy consumption, and health and well-being.

Architectural researchers bring distinct qualities to research such as an inherent applied-research focus, interdisciplinary projects, and design-based thinking. Researchers are disseminating their work in traditional publication venues and simultaneously, applying their findings into projects for communities, housing, and transportation. Researchers are creating design guides and software to reduce factors that cause asthma, to increase water efficiency, and to sustainably plan projects. Architectural training enables faculty to lead interdisciplinary research projects and partnering with such fields as engineering, ecology, and medicine, paralleling the design of buildings where the expertise and priorities of multiple fields are incorporated to create something larger together. An additional benefit of architectural research is that it can be quickly incorporated and tested in their intended use. ASCA members are constructing prototype buildings, wall assemblies, and new materials that are being used to continue their research and at the same time winning design awards.

Architecture is a STEM discipline, though not obviously apparent in the acronym. Science, technology, engineering, and math are essential to the education, practice, and researchers in the field. A 2017 internal study by ACSA found that members are already engaged in over $23 M of STEM-related research from sources including the National Science Foundation, US Department of Energy and the National Institutes of Health. The Associated Collegiate Schools of Architecture supports this work and once again requests that architecture be recognized for its contribution to STEM and for the potential of architectural research.

Appendix B

ACSA Statement of Support for inclusion of CIP code 04.0201 Architecture on Department of Homeland Security's STEM Designated Degree Program list

The Association of Collegiate Schools of Architecture (ACSA) is a nonprofit association of over 200 member schools. These include all accredited architecture degree programs in institutions of higher education in the United States, as well as government-sanctioned schools in Canada. Through this membership, over 5,000 faculty members in architecture and allied disciplines are represented. Serving as the voice of architectural educators, ACSA is the forum for ideas and issues that will affect architectural education and practice, design and building industry research, policy development, and liaison with allied professionals.

Architecture is a STEM discipline. The Board of Directors of the ACSA respectfully asks Department of Homeland Security to include CIP code 04.0201 Architecture on the STEM Designated Degree Program list.

CIP code 04.0201 is assigned to the majority of professional architecture programs accredited by National Architectural Accrediting Board (NAAB). First-professional Bachelor and Master of Architecture degrees from NAAB accredited programs are prerequisites for licensure and practice in most states in the US and Canada.

NAAB Conditions for Accreditation requires architecture programs to demonstrate student's proficiency in building science, mechanical engineering, structural engineering, and building construction technology, well-accepted STEM disciplines. In fact, 10 out of 26 Student Performance Criteria (SPC's) are directly about each discipline or application/ integration of these disciplines into the architectural design. This breadth of STEM content in our discipline is necessary as architects lead multidisciplinary teams of designers, engineers, and consultants to efficiently integrate building systems and improve the public health and welfare.

Architecture is a STEM discipline, though not obviously apparent in the acronym. Science, technology, engineering, and math are essential to the education, practice, and researchers in the field. Moreover, it is one of the key disciplines to address energy and climate change issues critical to the technology enterprise for US to successfully compete, prosper, and be secure in the global community of the twenty-first century.

Appendix C

Funding Agencies and Programs

Federal Funding Agencies
National Science Foundation (x 12)
NSF CAREER
Social Sciences and Humanities Research Council of Canada
DOE
NEA (x 3)
Chinese government
National Endowment for the Humanities
National Institutes of Health

Governmental Organizations
National Institute of Standards and Technology of the US Department of Commerce
U.S. Deptartment of Housing and Urban Development (x 2)
United States Environmental Protection Agency (x 3)
Department of State
Department of the Navy (x2)
US Department of Transportation
Centers for Disease Control and Prevention (CDC) (x 2)
Parks Canada
National Park Service

Industry
Autodesk (x 2)
Ford Motor Company (x 5)
Precast/ Prestressed Concrete Institute Foundation (x 4)
Perkins & Will
AECOM/Stantec
Takenaka Construction (Kyoto, Japan)

National Organization
American Institute of Architects (x 5)
The Nature Conservancy
American Philosophical Society
Canada Council for the Arts
Social Sciences and Humanities Research Council (x 2)
Social Sciences and Humanities Research Council of Canada
Society of Architectural Historians
Canadian Centre for Architecture (x 2)
Council on Tall Buildings and Urban Habitats
Landscape Architecture Foundation

Private Foundations
National
Andrew Mellon Foundation (x 4)
WK Kellogg Foundation
Graham Foundation (x 6)
Charles Pankow Foundation
Alfred P. Sloan Foundation (x 2)
Kresge Foundation
Knight, John S. and James L., Foundation
W.M. Keck Foundation
MacArthur Foundation, Housing Matters
Regional
Barr Foundation

Appendix D

List of Programs filed under CIP code 04.0902

Institution	CIP Code	Graduate Degree	Undergrad Degree	Confirming Display on Website
Arizona State UniversityTempe	4.0902	MARCH		https://design.asu.edu/degree-programs/architecture-march
Ball State Univ.	4.0902	Graduate Certificate in Digital Design and Fabrication		https://cms.bsu.edu/-/media/www/departmentalcontent/factbook/1617pdfs/cip%20codes%20by%20college%20and%20department%20for%20fact%20book_2016-17.pdf?la=en
Carnegie Mellon University	4.0902	MSBPD/PhD-BPD/ MSSD/MSCD/PhD-CD (STEM Designated)		https://soa.cmu.edu/graduate/
Colombia GSAPP	4.0902	MARCH		https://www.arch.columbia.edu/admissions
Georgia Institute of Technology	4.0902	MARCH/MSARCH		https://arch.gatech.edu/news/georgia-tech-master-architecture-now-stem-degree-program
University of Michigan	4.0902	MARCH/MSARCH/ MUD/MURP		https://taubmancollege.umich.edu/architecture/degrees/master-architecture https://taubmancollege.umich.edu/architecture/degrees/master-science-architecture http://taubmancollege.umich.edu/architecture/degrees/master-urban-design https://taubmancollege.umich.edu/urban-planning/degrees/master-urban-and-regional-planning
Philadelphia University (Thomas Jefferson Univ)	4.0902	MSARCH/MSSD		http://www.philau.edu/msarch/ http://www.eastfalls.jefferson.edu/green/index.html
Rensselaer Polytechnic Institute	4.0902	MARCH, MSARCH, and MSAS		http://www.arch.rpi.edu/academic/graduate/
Savannah College of Art and Design	4.0902	MARCH	BFA Arch	https://www.scad.edu/sites/default/files/PDF/SCAD-Majors-by-CIP-Code-degrees.pdf
University of Massachusetts Amherst	4.0902	MARCH	BFA ARCH	https://www.umass.edu/architecture/news/stem-designation
University of Minnesota Twin Cities	4.0902	MSARCH (various concentration)		http://arch.design.umn.edu/programs/msrp/
University of Pennsylvania	4.0902	MARCH/MEBD/MS-Des/MSHP/MUSA		https://www.design.upenn.edu/news/post/five-penndesign-programs-earn-stem-designation
University of Washington Seattle Campus	4.0902	MARCH-HPB (Post P) MSARCH MSCM		http://grad.uw.edu/admissions/find-a-program/

Appendix E

Program definition for CIP code 04.0902 annotated with the corresponding 2014 NAAB SPC
***courtesy of Andrew Vernooy, Montana State University**

CIP Code 04.0902
Architectural and Building Sciences/Technology

Definition: A program that focuses on the application of advanced technology to building design (A.2, A.4, A.5, B.2, B.3, C.3) and construction (B.4, B.5, B.6, B.7, B.8, B.9), retrofitting existing buildings, and efficient operations of buildings (D.1), including lighting and daylight design (B.6, B.7), acoustics (B.6), solar design (B.2, B.6), building conservation, and energy conscious design (B.2 B.3, B.6). Includes instruction in architecture (All Design Studios above 1st Year), building technology (B.1 through B.9, C.1 through C.3), civil and structural engineering (B.2, B.5), mechanical engineering (B.6), environmental control systems (B.6), sustainability (B.2, B.3, B.6, C.2), and computer tools applications (A.1, B.4, C.2).

Links to Additional Information

STEM 2026
https://innovation.ed.gov/files/2016/09/AIR-STEM2026_Report_2016.pdf

OPT Information
https://www.uscis.gov/working-united-states/students-and-exchange-visitors/students-and-employment/optional-practical-training

OPT information
www.nafsa.org/stemoptrule

STEM Designated Degree Program list
https://www.ice.gov/sites/default/files/documents/Document/2014/stem-list.pdf

STEM and Diversity
https://www2.ed.gov/about/inits/list/hispanic-initiative/stem-factsheet.pdf

Information on CIP/SEVIS
https://www.nafsa.org/Resource_Library_Assets/Regulatory_Information/Managing_The_Transition_From_CIP_2000_to_CIP_2010_Codes_In_SEVIS/

CIP Codes
https://nces.ed.gov/ipeds/cipcode/Files/Introduction_CIP2010.pd

National Science Foundation (NSF). 2018. GRFP, NSF Graduate Research Fellowship Program Primary Fields.
https://www.nsfgrfp.org/applicants/application_components/choosing_primary_field

ACSA Research & Scholarship Committee Members
Kelly Bair, University of Illinois at Chicago
Farzana Gandhi, New York Institute of Technology
Corey Griffin, Portland State University
Simon Kim, University of Pennsylvania
Marc J Neveu, Woodbury University
Hazem Rashed-Ali, University of Texas at San Antonio (chair)
Marci Uihlein, University of Illinois at Urbana-Champaign
Kentaro Tsubaki, Tulane University
Staff: Eric Wayne Ellis, Director of Operations & Programs, ACSA

For more information regarding the White Paper on Architectural Education/Research & STEM, please contact the ACSA Offices at:

1735 New York Avenue NW
Washington D.C. 20006
(202) 785-2324
info@acsa-arch.org

Special thanks to the Research and Scholarship Committee for their hard work in researching and compiling this document.

3 | AIA Press Release: Career and Technical Education bill to recognize architecture as STEM

Career and Technical Education bill to recognize architecture as STEM

By AIA Staff, July 26, 2018

THE US CAPITOL BUILDING

In a big win for architects, the US House of Representatives passed the Senate version of H.R.2353, the Carl D. Perkins Career and Technical Education (CTE) Act on Tuesday.

Architects across the country led the charge to pass this bill, highlighting its promise in discussions with their representatives. When the need arose, AIA component executives also dedicated significant time to such conversations, most notably in Kansas, South Carolina, Indiana, and Utah.

The bill, sponsored by Rep. Glenn Thompson (R-Pa.), Rep. Raja Krishnamoorthi (D-Il), Sen. Michael Enzi (R-WY) and Sen. Bob Casey (D-PA), allows states to use federal money to modernize CTE curricula, which includes architecture. In so doing, and for the first time, the legislation officially considers architecture a part of STEM education.

"After years of discussion by architects and educators, AIA is pleased that its lobbying efforts have succeeded and that the bill on Career Technical Education has passed," says Robert Ivy, FAIA, EVP/Chief Executive Officer of the American Institute of Architects. "It will encourage a more diverse workforce, fulfill the promise of design as the synthesis of art and science, and affect fundamental change in educational curricula."

Architecture has always represented the intersection of several disciplines, and its recognition as a STEM precept acknowledges the profession's long history of ingenuity and problem solving. AIA components may now work with their state departments of education to lobby for allocating federal grants for curriculum updates.

While architects and AIA components have been working to bring design to K-12 students through special programs and activities for years, this bill helps codify those efforts. Importantly, it exposes a new generation of students, and better prepares them for, a career in architecture.

*Text "**AIA**" to **40649** to join Architect Action Alerts and receive timely updates on issues impacting architects.*

H. R. 2353

One Hundred Fifteenth Congress of the United States of America

AT THE SECOND SESSION

Begun and held at the City of Washington on Wednesday, the third day of January, two thousand and eighteen

An Act

To reauthorize the Carl D. Perkins Career and Technical Education Act of 2006.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Strengthening Career and Technical Education for the 21st Century Act".

SEC. 2. TABLE OF CONTENTS.

The table of contents for this Act is as follows:

SEC. 3. REFERENCES.

Except as otherwise expressly provided, whenever in this Act an amendment or repeal is expressed in terms of an amendment to, or repeal of, a section or other provision, the reference shall be considered to be made to a section or other provision of the Carl D. Perkins Career and Technical Education Act of 2006 (20 U.S.C. 2301 et seq.).

SEC. 4. EFFECTIVE DATE.

This Act, and the amendments made by this Act, shall take effect beginning on July 1, 2019.

SEC. 5. TABLE OF CONTENTS OF THE CARL D. PERKINS CAREER AND TECHNICAL EDUCATION ACT OF 2006.

Section 1(b) is amended to read as follows:

"(b) TABLE OF CONTENTS.—The table of contents for this Act is as follows:

SEC. 6. PURPOSE.

Section 2 (20 U.S.C. 2301) is amended—

(1) in the matter preceding paragraph (1)—

(A) by striking "academic and career and technical skills" and inserting "academic knowledge and technical and employability skills"; and

(B) by inserting "and programs of study" after "technical education programs";

(2) in paragraph (1), by striking "high demand occupations" and inserting "in-demand occupations";

(3) in paragraph (3), by striking ", including tech prep education";

(4) in paragraph (4), by inserting "and programs of study" after "technical education programs";

(5) in paragraph (6), by striking "and" after the semicolon;

(6) in paragraph (7), by striking the period at the end and inserting "; and"; and

(7) by adding at the end the following:

"(8) increasing the employment opportunities for populations who are chronically unemployed or underemployed, including individuals with disabilities, individuals from economically disadvantaged families, out-of-workforce individuals, youth who are in, or have aged out of, the foster care system, and homeless individuals.".

SEC. 7. DEFINITIONS.

Section 3 (20 U.S.C. 2302) is amended—

(1) by striking paragraphs (10), (16), (23), (24), (25), (26), and (32);

(2) by redesignating paragraphs (8), (9), (11), (12), (13), (14), (15), (17), (18), (19), (20), (21), (22), (27), (28), (29), (30), (31), (33), and (34) as paragraphs (9), (10), (17), (18), (20), (21), (24), (28), (30), (31), (33), (34), (39), (44), (45), (48), (49), (50), (51), and (52), respectively;

(3) in paragraph (2), by striking ", including information as described in section 118".

(4) in paragraph (3)—

(A) in subparagraph (B), by striking "5 different occupational fields to individuals who are available for study in preparation for entering the labor market" and inserting "3 different fields that are available to all students, especially in high-skill, high-wage, or in-demand industry sectors or occupations"; and

(B) in subparagraph (D), by striking "not fewer than 5 different occupational fields" and inserting "not fewer than 3 different occupational fields";

(5) in paragraph (5)—

(A) in subparagraph (A)—

(i) by amending clause (i) to read as follows:

"(i) provides individuals with rigorous academic content and relevant technical knowledge and skills needed to prepare for further education and careers in current or emerging professions, which may include high-skill, high-wage, or in-demand industry sectors or occupations, which shall be, at the secondary level, aligned with the challenging State academic standards adopted by a State under section 1111(b)(1) of the Elementary and Secondary Education Act of 1965;";

(ii) in clause (ii), by striking ", an industry-recognized credential, a certificate, or an associate degree" and inserting "or a recognized postsecondary credential, which may include an industry-recognized credential, a certificate, or an associate degree"; and

(iii) in clause (iii), by striking "and" at the end;

(B) in subparagraph (B)—

(i) by inserting ", work-based, or other" after "competency-based";

(ii) by striking "contributes to the" and inserting "supports the development of";

(iii) by striking "general"; and

(iv) by striking the period at the end and inserting a semicolon; and

(C) by adding at the end the following:

"(C) to the extent practicable, coordinate between secondary and postsecondary education programs through programs of study, which may include coordination through articulation agreements, early college high school programs, dual or concurrent enrollment program opportunities, or other credit transfer agreements that provide postsecondary credit or advanced standing; and

"(D) may include career exploration at the high school level or as early as the middle grades (as such term is defined in section 8101 of the Elementary and Secondary Education Act of 1965).";

(6) in paragraph (7)—

(A) in subparagraph (A)—

(i) by striking "(and parents, as appropriate)" and inserting "(and, as appropriate, parents and out-of-school youth)";

(ii) by inserting "exploration opportunities" after "regarding career awareness"; and

(iii) by striking "and" after the semicolon;

(B) in subparagraph (B)—

(i) by inserting "to students (and, as appropriate, parents and out-of-school youth)" after "provides information"; and

(ii) by striking "financial aid," and all that follows through the end of the subparagraph and inserting "financial aid, job training, secondary and postsecondary options (including associate and baccalaureate degree programs), dual or concurrent enrollment programs, work-based learning opportunities, early college high schools, financial literacy, and support services, as appropriate; and"; and

(C) by adding at the end the following:

"(C) may provide assistance for special populations with respect to direct support services that enable students to persist in and complete career and technical education, programs of study, or career pathways.";

(7) by inserting after paragraph (7) the following:

"(8) CAREER PATHWAYS.—The term 'career pathways' has the meaning given the term in section 3 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3102).";

(8) by inserting after paragraph (10) (as redesignated by paragraph (2)) the following:

"(11) CREDIT TRANSFER AGREEMENT.—The term 'credit transfer agreement' means a formal agreement, such as an articulation agreement, among and between secondary and postsecondary education institutions or systems that grant students transcripted postsecondary credit, which may include credit granted to students in dual or concurrent enrollment programs or early college high school, dual credit, articulated credit, and credit granted on the basis of performance on technical or academic assessments.

"(12) CTE CONCENTRATOR.—The term 'CTE concentrator' means—

"(A) at the secondary school level, a student served by an eligible recipient who has completed at least 2 courses in a single career and technical education program or program of study; and

"(B) at the postsecondary level, a student enrolled in an eligible recipient who has—

"(i) earned at least 12 credits within a career and technical education program or program of study; or

"(ii) completed such a program if the program encompasses fewer than 12 credits or the equivalent in total.

"(13) CTE PARTICIPANT.—The term 'CTE participant' means an individual who completes not less than one course in a career and technical education program or program of study of an eligible recipient.

"(14) DIRECTOR.—The term 'Director' means the Director of the Institute of Education Sciences.

"(15) DUAL OR CONCURRENT ENROLLMENT PROGRAM.—The term 'dual or concurrent enrollment program' has the meaning given the term in section 8101 of the Elementary and Secondary Education Act of 1965.

"(16) EARLY COLLEGE HIGH SCHOOL.—The term 'early college high school' has the meaning given the term in section 8101 of the Elementary and Secondary Education Act of 1965.";

(9) by inserting after paragraph (18) (as redesignated by paragraph (2)) the following:

"(19) ELIGIBLE ENTITY.—The term 'eligible entity' means a consortium that includes the following:

"(A) Representatives of not less than 2 of the following categories of entities, 1 of which shall serve as the fiscal agent for the consortium:

"(i) A local educational agency or a consortium of such agencies.

"(ii) An educational service agency serving secondary school students.

"(iii) An area career and technical education school or a consortium of such schools.

"(iv) An Indian Tribe, Tribal organization, or Tribal educational agency.

"(v) An institution of higher education whose most common degree awarded is an associate degree, or a consortium of such institutions.

"(vi) An institution of higher education whose most common degree awarded is a bachelor's or higher degree, or a consortium of such institutions.

"(vii) A State educational agency.

"(B) One or more business or industry representative partners, which may include representatives of local or regional businesses or industries, including industry or sector partnerships in the local area, local workforce development boards, or labor organizations.

"(C) One or more stakeholders, which may include—

"(i) parents and students;

"(ii) representatives of local agencies serving out-of-school youth, homeless children and youth, and at-risk youth (as defined in section 1432 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 6472));

"(iii) representatives of Indian tribes and Tribal organizations, where applicable;

"(iv) representatives of minority-serving institutions (as described in paragraphs (1) through (7) of section 371(a) of the Higher Education Act of 1965 (20 U.S.C. 1067q(a)), where applicable;

"(v) representatives of special populations;

"(vi) representatives of adult career and technical education providers; or

"(vii) other relevant community stakeholders.";

(10) by amending paragraph (20) (as redesignated by paragraph (2)) to read as follows:

"(20) ELIGIBLE INSTITUTION.—The term 'eligible institution' means—

"(A) a consortium of 2 or more of the entities described in subparagraphs (B) through (F);

"(B) a public or nonprofit private institution of higher education that offers and will use funds provided under this title in support of career and technical education courses that lead to technical skill proficiency or a recognized postsecondary credential, including an industry-recognized credential, a certificate, or an associate degree;

"(C) a local educational agency providing education at the postsecondary level;

"(D) an area career and technical education school providing education at the postsecondary level;

"(E) an Indian Tribe, Tribal organization, or Tribal education agency that operates a school or may be present in the State;

"(F) a postsecondary educational institution controlled by the Bureau of Indian Education or operated by or on behalf of any Indian Tribe that is eligible to contract with the Secretary of the Interior for the administration of programs under the Indian Self-Determination and Education

Assistance Act (25 U.S.C. 5301 et seq.) or the Act of April 16, 1934 (25 U.S.C. 5342 et seq.);

"(G) a tribally controlled college or university; or

"(H) an educational service agency.";

(11) in paragraph (21) (as redesignated by paragraph (2)), by inserting "an Indian Tribe, Tribal organization, or Tribal educational agency" after "service agency,";

(12) by inserting after paragraph (21) (as redesignated by paragraph (2)) the following:

"(22) ENGLISH LEARNER.—The term 'English learner' means—

"(A) a secondary school student who is an English learner, as defined in section 8101 of the Elementary and Secondary Education Act of 1965; or

"(B) an adult or an out-of-school youth who has limited ability in speaking, reading, writing, or understanding the English language and—

"(i) whose native language is a language other than English; or

"(ii) who lives in a family environment or community in which a language other than English is the dominant language.

"(23) EVIDENCE-BASED.—The term 'evidence-based' has the meaning given the term in section 8101(21)(A) of the Elementary and Secondary Education Act of 1965.";

(13) by inserting after paragraph (24) (as redesignated by paragraph (2)) the following:

"(25) HIGH SCHOOL.—The term 'high school' has the meaning given the term in section 8101 of the Elementary and Secondary Education Act of 1965.

"(26) IN-DEMAND INDUSTRY SECTOR OR OCCUPATION.—The term 'in-demand industry sector or occupation' has the meaning given the term in section 3 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3102).

"(27) INDIAN; INDIAN TRIBE.—The terms 'Indian' and 'Indian Tribe' have the meanings given the terms 'Indian' and 'Indian tribe', respectively, in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5304).";

(14) by inserting after paragraph (28) (as redesignated by paragraph (2)) the following:

"(29) INDUSTRY OR SECTOR PARTNERSHIP.—The term 'industry or sector partnership' has the meaning given the term in section 3 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3102).";

(15) by inserting after paragraph (31) (as redesignated by paragraph (2)) the following:

"(32) LOCAL WORKFORCE DEVELOPMENT BOARD.—The term 'local workforce development board' means a local workforce development board established under section 107 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3122).";

(16) in paragraph (33) (as redesignated by paragraph (2)), by striking "including" and inserting "such as";

(17) by inserting after paragraph (34) (as redesignated by paragraph (2)) the following:

"(35) OUT-OF-SCHOOL YOUTH.—The term 'out-of-school youth' has the meaning given the term in section 3 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3102).

"(36) OUT-OF-WORKFORCE INDIVIDUAL.—The term 'out-of-workforce individual' means—

"(A) an individual who is a displaced homemaker, as defined in section 3 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3102); or

"(B) an individual who—

"(i)(I) has worked primarily without remuneration to care for a home and family, and for that reason has diminished marketable skills; or

"(II) is a parent whose youngest dependent child will become ineligible to receive assistance under part A of title IV of the Social Security Act (42 U.S.C. 601 et seq.) not later than 2 years after the date on which the parent applies for assistance under such title; and

"(ii) is unemployed or underemployed and is experiencing difficulty in obtaining or upgrading employment.

"(37) PARAPROFESSIONAL.—The term 'paraprofessional' has the meaning given the term in section 8101 of the Elementary and Secondary Education Act of 1965.

"(38) PAY FOR SUCCESS INITIATIVE.—

"(A) IN GENERAL.—Subject to subparagraph (B), the term 'pay for success initiative' means a performance-based grant, contract, or cooperative agreement awarded by a State or local public entity (such as a local educational agency) to a public or private nonprofit entity—

"(i) in which a commitment is made to pay for improved outcomes that result in increased public value and social benefit to students and the public sector, such as improved student outcomes as evidenced by the indicators of performance described in section 113(b)(2) and direct cost savings or cost avoidance to the public sector; and

"(ii) that includes—

"(I) a feasibility study on the initiative describing how the proposed intervention is based on evidence of effectiveness;

"(II) a rigorous, third-party evaluation that uses experimental or quasi-experimental design or other research methodologies that allow for the strongest possible causal inferences to determine whether the initiative has met its proposed outcomes;

"(III) an annual, publicly available report on the progress of the initiative; and

"(IV) a requirement that payments are made to the recipient of a grant, contract, or cooperative agreement only when agreed upon outcomes are achieved, except that the entity may make payments to the third party conducting the evaluation described in subclause (II).

"(B) EXCLUSION.—The term 'pay for success initiative' does not include any initiative that—

"(i) reduces the special education or related services that a student would otherwise receive under the Individuals with Disabilities Education Act; or

"(ii) otherwise reduces the rights of a student or the obligations of an entity under the Individuals with Disabilities Education Act, the Rehabilitation Act of 1973 (29 U.S.C. 701 et seq.), the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.), or any other law.".

(18) in paragraph (39)(C) (as redesignated by paragraph (2)), by striking "apprenticeship" and inserting "other skilled training";

(19) by inserting after paragraph (39) (as redesignated by paragraph (2)) the following:

"(40) PROFESSIONAL DEVELOPMENT.—The term 'professional development' means activities that—

"(A) are an integral part of eligible agency, eligible recipient, institution, or school strategies for providing educators (including teachers, principals, other school leaders, administrators, specialized instructional support personnel, career guidance and academic counselors, and paraprofessionals) with the knowledge and skills necessary to enable students to succeed in career and technical education, to meet challenging State academic standards under section 1111(b)(1) of the Elementary and Secondary Education Act, or to achieve academic skills at the postsecondary level; and

"(B) are sustained (not stand-alone, 1-day, or short-term workshops), intensive, collaborative, job-embedded, data-driven, and classroom-focused, to the extent practicable evidence-based, and may include activities that—

"(i) improve and increase educators'—

"(I) knowledge of the academic and technical subjects;

"(II) understanding of how students learn; and

"(III) ability to analyze student work and achievement from multiple sources, including how to adjust instructional strategies, assessments, and materials based on such analysis;

"(ii) are an integral part of eligible recipients' improvement plans;

"(iii) allow personalized plans for each educator to address the educator's specific needs identified in observation or other feedback;

"(iv) support the recruitment, hiring, and training of effective educators, including educators who became certified through State and local alternative routes to certification;

"(v) advance educator understanding of—

"(I) effective instructional strategies that are evidence-based; and

"(II) strategies for improving student academic and technical achievement or substantially increasing the knowledge and teaching skills of educators;

"(vi) are developed with extensive participation of educators, parents, students, and representatives of Indian Tribes (as applicable), of schools and institutions served under this Act;

"(vii) are designed to give educators of students who are English learners in career and technical education programs or programs of study the knowledge and skills to provide instruction and appropriate language and academic support services to those students, including the appropriate use of curricula and assessments;

"(viii) as a whole, are regularly evaluated for their impact on increased educator effectiveness and improved student academic and technical achievement, with the findings of the evaluations used to improve the quality of professional development;

"(ix) are designed to give educators of individuals with disabilities in career and technical education programs or programs of study the knowledge and skills to provide instruction and academic support services to those individuals, including positive behavioral interventions and supports, multi-tier system of supports, and use of accommodations;

"(x) include instruction in the use of data and assessments to inform and instruct classroom practice;

"(xi) include instruction in ways that educators may work more effectively with parents and families;

"(xii) provide follow-up training to educators who have participated in activities described in this paragraph that are designed to ensure that the knowledge and skills learned by the educators are implemented in the classroom;

"(xiii) promote the integration of academic knowledge and skills and relevant technical knowledge and skills, including programming jointly delivered to academic and career and technical education teachers; or

"(xiv) increase the ability of educators providing career and technical education instruction to stay current with industry standards.

"(41) PROGRAM OF STUDY.—The term 'program of study' means a coordinated, nonduplicative sequence of academic and technical content at the secondary and postsecondary level that—

"(A) incorporates challenging State academic standards, including those adopted by a State under section 1111(b)(1) of the Elementary and Secondary Education Act of 1965;

"(B) addresses both academic and technical knowledge and skills, including employability skills;

"(C) is aligned with the needs of industries in the economy of the State, region, Tribal community, or local area;

"(D) progresses in specificity (beginning with all aspects of an industry or career cluster and leading to more occupation-specific instruction);

"(E) has multiple entry and exit points that incorporate credentialing; and

"(F) culminates in the attainment of a recognized postsecondary credential.

"(42) QUALIFIED INTERMEDIARY.—The term 'qualified intermediary' means a nonprofit entity, which may be part of an industry or sector partnership, that demonstrates expertise in building, connecting, sustaining, and measuring partnerships with entities such as employers, schools, community-based organizations, postsecondary institutions, social service organizations, economic development organizations, Indian tribes or Tribal organizations, and workforce systems to broker services, resources, and supports to youth and the organizations and systems that are designed to serve youth, including—

"(A) connecting employers to classrooms;

"(B) assisting in the design and implementation of career and technical education programs and programs of study;

"(C) delivering professional development;

"(D) connecting students to internships and other work-based learning opportunities; and

"(E) developing personalized student supports.

"(43) RECOGNIZED POSTSECONDARY CREDENTIAL.—The term 'recognized postsecondary credential' has the meaning given the term in section 3 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3102).";

(20) by inserting after paragraph (45) (as redesignated by paragraph (2)) the following:

"(46) SPECIALIZED INSTRUCTIONAL SUPPORT PERSONNEL.—The term 'specialized instructional support personnel' has the meaning given the term in section 8101 of the Elementary and Secondary Education Act of 1965.

"(47) SPECIALIZED INSTRUCTIONAL SUPPORT SERVICES.—The term 'specialized instructional support services' has the meaning given the term in section 8101 of the Elementary and Secondary Education Act of 1965.";

(21) in paragraph (48) (as redesignated by paragraph (2))—

(A) in subparagraph (B), by striking "foster children" and inserting "low-income youth and adults";

(B) by striking subparagraph (E) and inserting the following:

"(E) out-of-workforce individuals;";

(C) in subparagraph (F), by striking "individuals with limited English proficiency." and inserting "English learners;"; and

(D) by adding at the end the following:

"(G) homeless individuals described in section 725 of the McKinney-Vento Homeless Assistance Act (42 U.S.C. 11434a);

"(H) youth who are in, or have aged out of, the foster care system; and

"(I) youth with a parent who—

"(i) is a member of the armed forces (as such term is defined in section 101(a)(4) of title 10, United States Code); and

"(ii) is on active duty (as such term is defined in section 101(d)(1) of such title).";

(22) in paragraph (50) (as redesignated by paragraph (2)), by inserting "(including paraprofessionals and specialized instructional support personnel)" after "supportive personnel";

(23) in paragraph (52) (as redesignated by paragraph (2))—

(A) in subparagraph (A), by striking "Indian tribe or Indian tribes" and inserting "Indian Tribe or Indian Tribes"; and

(B) in subparagraph (D)—

(i) by striking "tribal" and inserting "Tribal"; and

(ii) by inserting "or tribal lands" after "reservations"; and

(24) by adding at the end the following:

"(53) TRIBAL ORGANIZATION.—The term 'Tribal organization' has the meaning given the term 'tribal organization' in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5304).

"(54) UNIVERSAL DESIGN FOR LEARNING.—The term 'universal design for learning' has the meaning given the term in section 8101 of the Elementary and Secondary Education Act of 1965.

"(55) WORK-BASED LEARNING.—The term 'work-based learning' means sustained interactions with industry or community professionals in real workplace settings, to the extent practicable, or simulated environments at an educational institution that foster in-depth, firsthand engagement with the tasks required in a given career field, that are aligned to curriculum and instruction.".

SEC. 8. TRANSITION PROVISIONS.

Section 4 (20 U.S.C. 2303) is amended—

(1) by striking "the Secretary determines to be appropriate" and inserting "are necessary";

(2) by striking "Carl D. Perkins Career and Technical Education Improvement Act of 2006" each place it appears and inserting "Strengthening Career and Technical Education for the 21st Century Act"; and

(3) by striking "1998" and inserting "2006".

SEC. 9. PROHIBITIONS.

Section 8 (20 U.S.C. 2306a) is amended—

(1) in subsection (a), by striking "Federal Government to mandate," and all that follows through the period at the end and inserting "Federal Government—

"(1) to condition or incentivize the receipt of any grant, contract, or cooperative agreement, or the receipt of any priority or preference under such grant, contract, or cooperative agreement, upon a State, local educational agency, eligible agency, eligible recipient, eligible entity, or school's adoption or implementation of specific instructional content, academic standards and assessments, curricula, or program of instruction (including any condition, priority, or preference to adopt the Common Core State Standards developed under the Common Core State Standards Initiative, any other academic standards common to a significant number of States, or any assessment, instructional content, or curriculum aligned to such standards);

"(2) through grants, contracts, or other cooperative agreements, to mandate, direct, or control a State, local educational agency, eligible agency, eligible recipient, eligible entity, or school's specific instructional content, academic standards and assessments, curricula, or program of instruction (including any requirement, direction, or mandate to adopt the Common Core State Standards developed under the Common Core State

Standards Initiative, any other academic standards common to a significant number of States, or any assessment, instructional content, or curriculum aligned to such standards); or

"(3) except as required under sections 112(b), 211(b), and 223—

"(A) to mandate, direct, or control the allocation of State or local resources; or

"(B) to mandate that a State or a political subdivision of a State spend any funds or incur any costs not paid for under this Act.";

(2) by amending subsection (d) to read as follows:

"(d) RULE OF CONSTRUCTION.—Nothing in this section affects the applicability of subchapter II of chapter 5, and chapter 7, of title 5, United States Code, (commonly known as the "Administrative Procedure Act") or chapter 8 of title 5, United States Code, commonly known as the "Congressional Review Act").."; and

(3) by adding at the end the following:

"(f) CONGRESSIONAL NOTICE AND COMMENT.—

"(1) NOTICE TO CONGRESS.—Not less than 15 business days prior to issuing a notice of proposed rulemaking related to this Act in the Federal Register, the Secretary shall provide to the Committee on Health, Education, Labor, and Pensions of the Senate, the Committee on Education and the Workforce of the House of Representatives, and other relevant congressional committees, notice of the Secretary's intent to issue a notice of proposed rulemaking that shall include—

"(A) a copy of the proposed regulation;

"(B) the need to issue the regulation;

"(C) a description of how the regulation is consistent with the scope of this Act;

"(D) the anticipated burden (including the time, cost, and paperwork burden) the regulation will impose on an eligible agency, institution, or recipient that may be impacted by the regulation, including the potential impact on rural areas;

"(E) the anticipated benefits to an eligible agency, institution, or recipient that may be impacted by the regulation, including in rural areas; and

"(F) any regulations that will be repealed when the new regulation is issued.

"(2) COMMENT PERIOD FOR CONGRESS.—The Secretary shall—

"(A) before issuing any notice of proposed rulemaking under this subsection, provide Congress with a comment period of 15 business days to make comments on the proposed regulation, beginning on the date that the Secretary provides the notice of intent to the appropriate committees of Congress under paragraph (1); and

"(B) include and seek to address all comments submitted by members of Congress in the public rulemaking record for the regulation published in the Federal Register.

"(3) COMMENT AND REVIEW PERIOD; EMERGENCY SITUATIONS.—The comment and review period for any proposed regulation shall be not less than 60 days unless an emergency requires a shorter period, in which case the Secretary shall—

"(A) designate the proposed regulation as an emergency with an explanation of the emergency in the notice to Congress under paragraph (1);

"(B) publish the length of the comment and review period in such notice and in the Federal Register; and

"(C) conduct immediately thereafter regional meetings to review such proposed regulation before issuing any final regulation.".

SEC. 10. AUTHORIZATION OF APPROPRIATIONS.

Section 9 (20 U.S.C. 2307) is amended to read as follows:

"SEC. 9. AUTHORIZATION OF APPROPRIATIONS.

"There are authorized to be appropriated to carry out this Act (other than sections 114 and 117)—

"(1) $1,229,568,538 for fiscal year 2019;
"(2) $1,246,782,498 for fiscal year 2020;
"(3) $1,264,237,452 for fiscal year 2021;
"(4) $1,281,936,777 for fiscal year 2022;
"(5) $1,299,883,892 for fiscal year 2023; and
"(6) $1,318,082,266 for fiscal year 2024.".

TITLE I—CAREER AND TECHNICAL EDUCATION ASSISTANCE TO THE STATES

PART A—ALLOTMENT AND ALLOCATION

SEC. 110. RESERVATIONS AND STATE ALLOTMENT.

Section 111 (20 U.S.C. 2321) is amended to read as follows:

"SEC. 111. RESERVATIONS AND STATE ALLOTMENT.

"(a) RESERVATIONS AND STATE ALLOTMENT.—

"(1) RESERVATIONS.—From the amount appropriated under section 9 for each fiscal year, the Secretary shall reserve—

"(A) 0.13 percent to carry out section 115; and

"(B) 1.50 percent to carry out section 116, of which—

"(i) 1.25 percent of the sum shall be available to carry out section 116(b); and

"(ii) 0.25 percent of the sum shall be available to carry out section 116(h).

"(2) FOUNDATIONAL GRANT.—

"(A) IN GENERAL.—From the remainder of the amount appropriated under section 9 and not reserved under paragraph (1) for a fiscal year, the Secretary shall allot to a State for the fiscal year an amount equal to the amount the State received in fiscal year 2018.

"(B) RATABLE REDUCTION.—If for any fiscal year the amount appropriated for allotments under this section is insufficient to satisfy the provisions of subparagraph (A), the payments to all States under such subparagraph shall be ratably reduced.

"(3) ADDITIONAL FUNDS.—Subject to paragraph (4), from the additional funds remaining from the amount appropriated under section 9 and not expended under paragraphs (1) and (2) for a fiscal year, the Secretary shall allot to a State for the fiscal year—

"(A) an amount that bears the same ratio to 50 percent of the sum being allotted as the product of the population aged 15 to 19, inclusive, in the State in the fiscal year preceding the fiscal year for which the determination is made and the State's allotment ratio bears to the sum of the corresponding products for all the States;

"(B) an amount that bears the same ratio to 20 percent of the sum being allotted as the product of the population aged 20 to 24, inclusive, in the State in the fiscal year preceding the fiscal year for which the determination is made and the State's allotment ratio bears to the sum of the corresponding products for all the States;

"(C) an amount that bears the same ratio to 15 percent of the sum being allotted as the product of the population aged 25 to 65, inclusive, in the State in the fiscal year preceding the fiscal year for which the determination is made and the State's allotment ratio bears to the sum of the corresponding products for all the States; and

"(D) an amount that bears the same ratio to 15 percent of the sum being allotted as the amounts allotted to the State under subparagraphs (A), (B), and (C) for such years bears to the sum of the amounts allotted to all the States under subparagraphs (A), (B), and (C) for such year.

"(4) MINIMUM ALLOTMENT FOR YEARS WITH ADDITIONAL FUNDS.—

"(A) IN GENERAL.—Subject to subparagraph (B), for a fiscal year for which there are additional funds described in paragraph (3), no State shall receive for such fiscal year under paragraph (3) less than 1/2 of 1 percent of the additional funds available for such fiscal year. Amounts necessary for increasing such payments to States to comply with the preceding sentence shall be obtained by ratably reducing the amounts to be paid to other States.

"(B) SPECIAL RULE.—In the case of a qualifying State, the minimum allotment under subparagraph (A) for a fiscal year for the qualifying State shall be the lesser of—

"(i) 1/2 of 1 percent of the additional funds available for such fiscal year; and

"(ii) the product of—

"(I) 1/3 of the additional funds; multiplied by

"(II) the quotient of—

"(aa) the qualifying State's ratio described in subparagraph (C) for the fiscal year for which the determination is made; divided by

"(bb) the sum of all such ratios for all qualifying States for the fiscal year for which the determination is made.

"(C) RATIO.—For purposes of subparagraph (B)(ii)(II)(aa), the ratio for a qualifying State for a fiscal year shall be 1.00 less the quotient of—

"(i) the amount the qualifying State is allotted under paragraph (3) for the fiscal year; divided by

"(ii) 1/2 of 1 percent of the amount appropriated under paragraph (3) for the fiscal year for which the determination is made.

"(D) DEFINITIONS.—In this paragraph, the term 'qualifying State' means a State (except the United States Virgin

Islands) that, for the fiscal year for which a determination under this paragraph is made, would receive, under the allotment formula under paragraph (3) (without the application of this paragraph), an amount that would be less than the amount the State would receive under subparagraph (A) for such fiscal year.

"(b) REALLOTMENT.—If the Secretary determines that any amount of any State's allotment under subsection (a) for any fiscal year will not be required for such fiscal year for carrying out the activities for which such amount has been allotted, the Secretary shall make such amount available for reallotment. Any such reallotment among other States shall occur on such dates during the same year as the Secretary shall fix, and shall be made on the basis of criteria established by regulation. No funds may be reallotted for any use other than the use for which the funds were appropriated. Any amount reallotted to a State under this subsection for any fiscal year shall remain available for obligation during the succeeding fiscal year and shall be deemed to be part of the State's allotment for the year in which the amount is obligated.

"(c) ALLOTMENT RATIO.—

"(1) IN GENERAL.—The allotment ratio for any State shall be 1.00 less the product of—

"(A) 0.50; and

"(B) the quotient obtained by dividing the per capita income for the State by the per capita income for all the States (exclusive of the Commonwealth of Puerto Rico and the United States Virgin Islands), except that—

"(i) the allotment ratio in no case shall be more than 0.60 or less than 0.40; and

"(ii) the allotment ratio for the Commonwealth of Puerto Rico and the United States Virgin Islands shall be 0.60.

"(2) PROMULGATION.—The allotment ratios shall be promulgated by the Secretary for each fiscal year between October 1 and December 31 of the fiscal year preceding the fiscal year for which the determination is made. Allotment ratios shall be computed on the basis of the average of the appropriate per capita incomes for the 3 most recent consecutive fiscal years for which satisfactory data are available.

"(3) DEFINITION OF PER CAPITA INCOME.—For the purpose of this section, the term 'per capita income' means, with respect to a fiscal year, the total personal income in the calendar year ending in such year, divided by the population of the area concerned in such year.

"(4) POPULATION DETERMINATION.—For the purposes of this section, population shall be determined by the Secretary on the basis of the latest estimates available to the Department of Education.

"(d) DEFINITION OF STATE.—For the purpose of this section, the term 'State' means each of the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, and the United States Virgin Islands.".

SEC. 111. WITHIN STATE ALLOCATION.

Section 112 (20 U.S.C. 2322) is amended—

(1) in subsection (a)—

(A) in paragraph (1), by striking "10 percent" and inserting "15 percent";

(B) in paragraph (2)—

(i) in subparagraph (A)—

(I) by striking "1 percent" and inserting "2 percent";

(II) by striking "State correctional institutions and institutions" and inserting "State correctional institutions, juvenile justice facilities, and educational institutions"; and

(III) by striking "and" after the semicolon; and

(ii) by inserting after subparagraph (B) the following:

"(C) an amount shall be made available for the recruitment of special populations to enroll in career and technical education programs, which shall be not less than the lesser of—

"(i) an amount equal to 0.1 percent; or

"(ii) $50,000; and";

(C) in paragraph (3)(B), by striking "a local plan;" and inserting "local applications;"; and

(2) in subsection (c), by striking "section 135" and all that follows through the end and inserting "section 135—

"(1) in—

"(A) rural areas;

"(B) areas with high percentages of CTE concentrators or CTE participants;

"(C) areas with high numbers of CTE concentrators or CTE participants; and

"(D) areas with disparities or gaps in performance as described in section 113(b)(3)(C)(ii)(II); and

"(2) in order to—

"(A) foster innovation through the identification and promotion of promising and proven career and technical education programs, practices, and strategies, which may include programs, practices, and strategies that prepare individuals for nontraditional fields; or

"(B) promote the development, implementation, and adoption of programs of study or career pathways aligned with State-identified high-skill, high-wage, or in-demand occupations or industries.".

SEC. 112. ACCOUNTABILITY.

Section 113 (20 U.S.C. 2323) is amended—

(1) in subsection (b)—

(A) in the subsection heading, by inserting "DETERMINED" after "STATE";

(B) in paragraph (1)—

(i) in the matter preceding subparagraph (A), by inserting "State determined" before "performance";

(ii) by striking subparagraph (B) and redesignating subparagraph (C) as subparagraph (B);

(iii) in subparagraph (A), by inserting "and" after the semicolon; and

(iv) in subparagraph (B), as so redesignated—

(I) by striking "a State adjusted level of performance" and inserting "a State determined level of performance"; and

(II) by striking ", and State levels of performance described in paragraph (3)(B) for each additional indicator of performance"; and

(C) by striking paragraph (2) and inserting the following:

"(2) INDICATORS OF PERFORMANCE.—

"(A) CORE INDICATORS OF PERFORMANCE FOR CTE CONCENTRATORS AT THE SECONDARY LEVEL.—Each eligible agency shall identify in the State plan core indicators of performance for CTE concentrators at the secondary level that are valid and reliable, and that include, at a minimum, measures of each of the following:

"(i) The percentage of CTE concentrators who graduate high school, as measured by—

"(I) the four-year adjusted cohort graduation rate (defined in section 8101 of the Elementary and Secondary Education Act of 1965); and

"(II) at the State's discretion, the extended-year adjusted cohort graduation rate defined in such section 8101.

"(ii) CTE concentrator proficiency in the challenging State academic standards adopted by the State under section 1111(b)(1) of the Elementary and Secondary Education Act of 1965, as measured by the academic assessments described in section 1111(b)(2) of such Act.

"(iii) The percentage of CTE concentrators who, in the second quarter after exiting from secondary education, are in postsecondary education or advanced training, military service or a service program that receives assistance under title I of the National and Community Service Act of 1990 (42 U.S.C. 12511 et seq.), are volunteers as described in section 5(a) of the Peace Corps Act (22 U.S.C. 2504(a)), or are employed.

"(iv) Indicators of career and technical education program quality as follows:

"(I) That shall include at least 1 of the following:

"(aa) The percentage of CTE concentrators graduating from high school having attained a recognized postsecondary credential.

"(bb) The percentage of CTE concentrators graduating from high school having attained postsecondary credits in the relevant career and technical education program or program of study earned through a dual or concurrent enrollment program or another credit transfer agreement.

"(cc) The percentage of CTE concentrators graduating from high school having participated in work-based learning.

"(II) That may include any other measure of student success in career and technical education

that is statewide, valid, and reliable, and comparable across the State.

"(v) The percentage of CTE concentrators in career and technical education programs and programs of study that lead to non-traditional fields.

"(B) CORE INDICATORS OF PERFORMANCE FOR CTE CONCENTRATORS AT THE POSTSECONDARY LEVEL.—Each eligible agency shall identify in the State plan core indicators of performance for CTE concentrators at the postsecondary level that are valid and reliable, and that include, at a minimum, measures of each of the following:

"(i) The percentage of CTE concentrators who, during the second quarter after program completion, remain enrolled in postsecondary education, are in advanced training, military service, or a service program that receives assistance under title I of the National and Community Service Act of 1990 (42 U.S.C. 12511 et seq.), are volunteers as described in section 5(a) of the Peace Corps Act (22 U.S.C. 2504(a)), or are placed or retained in employment.

"(ii) The percentage of CTE concentrators who receive a recognized postsecondary credential during participation in or within 1 year of program completion.

"(iii) The percentage of CTE concentrators in career and technical education programs and programs of study that lead to non-traditional fields.

"(C) ALIGNMENT OF PERFORMANCE INDICATORS.—In developing core indicators of performance under subparagraphs (A) and (B), an eligible agency shall, to the greatest extent possible, align the indicators so that substantially similar information gathered for other State and Federal programs, or for any other purpose, may be used to meet the requirements of this section.";

(D) in paragraph (3)—

(i) in the paragraph heading, by inserting "DETERMINED" after "STATE";

(ii) by amending subparagraph (A) to read as follows:

"(A) STATE DETERMINED LEVELS OF PERFORMANCE FOR CORE INDICATORS OF PERFORMANCE.—

"(i) IN GENERAL.—

"(I) LEVELS DETERMINED BY THE ELIGIBLE AGENCY.—Each eligible agency, with input from eligible recipients, shall establish in the State plan submitted under section 122, for each year covered by the State plan, State determined levels of performance for each of the core indicators described under subparagraphs (A) and (B) of paragraph (2) for career and technical education activities authorized under this title. The level of performance for a core indicator shall be the same for all CTE concentrators in the State.

"(II) TECHNICAL ASSISTANCE.—The Secretary may assist an eligible agency in establishing the State determined levels of performance under this subparagraph only at the request of that eligible agency.

"(III) REQUIREMENTS.—Such State determined levels of performance shall, at a minimum—

"(aa) be expressed in a percentage or numerical form, so as to be objective, quantifiable, and measurable;

"(bb) require the State to continually make meaningful progress toward improving the performance of all career and technical education students, including the subgroups of students described in section 1111(h)(1)(C)(ii) of the Elementary and Secondary Education Act of 1965, and special populations, as described in section 3(48); and

"(cc) have been subject to the public comment process described in subparagraph (B), and the eligible agency has provided a written response;

"(dd) when being adjusted pursuant to clause (ii), take into account how the levels of performance involved compare with the State levels of performance established for other States, considering factors including the characteristics of actual (as opposed to anticipated) CTE concentrators when the CTE concentrators entered the program, and the services or instruction to be provided;

"(ee) when being adjusted pursuant to clause (ii), be higher than the average actual performance of the 2 most recently completed program years, except in the case of unanticipated circumstances that require revisions in accordance with clause (iii); and

"(ff) take into account the extent to which the State determined levels of performance advance the eligible agency's goals, as set forth in the State plan.

"(ii) ALLOWABLE ADJUSTMENT OF STATE DETERMINED LEVELS OF PERFORMANCE FOR SUBSEQUENT YEARS.—Prior to the third program year covered by the State plan, each eligible agency may revise the State determined levels of performance for any of the core indicators of performance for the subsequent program years covered by the State plan, and submit the revised State determined levels of performance to the Secretary. If the eligible agency adjusts any levels of performance, the eligible agency shall adjust those levels in accordance with clause (i), and address written comments of stakeholders as described in subparagraph (B). The Secretary shall approve those revised levels of performance if those levels meet the requirements described in subclause (III) of clause (i). The State determined adjusted levels of performance identified under this clause shall be considered to be the State determined levels of performance for the State for such years and shall be incorporated into the State plan.

"(iii) UNANTICIPATED CIRCUMSTANCES.—If unanticipated circumstances arise in a State or changes occur related to improvements in data or measurement approaches, the eligible agency, at the end of the program year, may revise the State determined levels of performance required under this subparagraph. After public comment, as described in subparagraph (B), the eligible agency shall submit such revised levels of performance to the Secretary with evidence supporting the revision. The Secretary shall approve any such revision if that revision meets the requirements of clause (ii).";

(iii) by striking subparagraph (B) and inserting the following:

"(B) PUBLIC COMMENT.—

"(i) IN GENERAL.—Each eligible agency shall develop the levels of performance under subparagraph (A) in consultation with the stakeholders identified in section 122(c)(1)(A).

"(ii) WRITTEN COMMENTS.—Not less than 60 days prior to submission of the State plan, the eligible agency shall provide such stakeholders with the opportunity to provide written comments to the eligible agency, which shall be included in the State plan, regarding how the levels of performance described under subparagraph (A)—

"(I) meet the requirements of the law;

"(II) support the improvement of performance of all CTE concentrators, including subgroups of students, as described in section 1111(h)(1)(C)(ii) of the Elementary and Secondary Education Act of 1965, and special populations, as described in section 3(48); and

"(III) support the needs of the local education and business community.

"(iii) ELIGIBLE AGENCY RESPONSE.—Each eligible agency shall provide, in the State plan, a written response to the comments provided by stakeholders under clause (ii).";

(iv) by adding at the end the following:

"(C) STATE REPORT.—

"(i) IN GENERAL.—Each eligible agency that receives an allotment under section 111 shall annually prepare and submit to the Secretary a report regarding—

"(I) the progress of the State in achieving the State determined levels of performance on the core indicators of performance; and

"(II) the actual levels of performance for all CTE concentrators, and for each of the subgroups of students, as described in section 1111(h)(1)(C)(ii) of the Elementary and Secondary Education Act of 1965, and special populations, as described in section 3(48).

"(ii) DATA.—Except as provided in subparagraph (E), each eligible agency that receives an allotment under section 111 shall—

"(I) disaggregate data for each of the indicators of performance under paragraph (2)—

"(aa) for subgroups of students, as described in section 1111(h)(1)(C)(ii) of the Elementary and Secondary Education Act of 1965, and special populations, as described in section 3(48), that are served under this Act; and

"(bb) by the career and technical education programs or programs of study of the CTE concentrators, except that in a case in which reporting by such program or program of study is impractical, the data may be disaggregated by the career clusters of the CTE concentrators, if appropriate;

"(II) identify and quantify any disparities or gaps in performance on the State determined levels of performance under subparagraph (A) between any such subgroup or special population and the performance of all CTE concentrators served by the eligible agency under this Act, which shall include a quantifiable description of the progress each such subgroup or special population of students served by the eligible agency under this Act has made in meeting the State determined levels of performance; and

"(III) for CTE concentrators described in paragraph (2)(A)(iii) and paragraph (2)(B)(i), disaggregate data, to the extent such data is available, by each of the following:

"(aa) Individuals enrolled in postsecondary education (disaggregated by postsecondary award level, including certificate, associate, or baccalaureate degree).

"(bb) Individuals in advanced training.

"(cc) Individuals in military service or a service program that receives assistance under title I of the National and Community Service Act of 1990 (42 U.S.C. 12511 et seq.) or volunteers as described in section 5(a) of the Peace Corps Act (22 U.S.C. 2504(a)).

"(dd) Individuals in employment (including those individuals who are employed in a high-skill, high-wage, or in-demand sector or occupation).

"(iii) NONDUPLICATION.—The Secretary shall ensure that each eligible agency does not report duplicative information under this section.

"(iv) INFORMATION DISSEMINATION.—The Secretary shall—

"(I) make the information contained in such reports available to the general public through a variety of formats, including electronically through the Internet;

"(II) disseminate State-by-State comparisons of the information contained in such reports; and

"(III) provide the appropriate committees of Congress with copies of such reports.

"(D) STATE DISSEMINATION OF ACTUAL LEVELS OF PERFORMANCE.—At the end of each program year, the eligible agency shall disseminate the actual levels of performance described in subparagraph (C)(i)(II)—

"(i) widely, including to students, parents, and educators;

"(ii) through a variety of formats, including electronically through the Internet; and

"(iii) in user-friendly formats and languages that are easily accessible, as determined by the eligible agency.

"(E) RULES FOR REPORTING DATA.—The disaggregation of data under this paragraph shall not be required when the number of students in a category is insufficient to yield statistically reliable information or when the results would reveal personally identifiable information about an individual student."; and

(E) in paragraph (4)—

(i) in subparagraph (A)—

(I) in the subparagraph heading, by striking "ADJUSTED";

(II) by striking clauses (iii) and (v), and redesignating clauses (iv) and (vi) as clauses (iii) and (v), respectively;

(III) in clause (i)—

(aa) in the matter preceding subclause (I)—

(AA) by striking "State adjusted levels of performance" and inserting "State determined levels of performance for each year of the plan"; and

(BB) by striking "local adjusted levels" and inserting "local levels" each place the term appears;

(bb) in subclause (I)—

(AA) by striking "consistent with the State levels of performance established under paragraph (3), so as" and inserting "consistent with the form expressed in the State determined levels, so as"; and

(BB) by striking "and" after the semicolon; and

(cc) in subclause (II), by striking "continually make progress toward improving the performance of career and technical education students." and inserting "continually make meaningful progress toward improving the performance of all CTE concentrators, including subgroups of students described in section 1111(h)(1)(C)(ii) of the Elementary and Secondary Education Act of 1965 and special populations, as described in section 3(48);"; and

(dd) by adding at the end the following:

"(III) when being adjusted as described in clause (iii), be higher than the average actual performance levels of the previous 2 program years, except in a case in which unanticipated circumstances arise with respect to the eligible recipient and that eligible recipient meets the requirements for revisions under clause (iv);

"(IV) when being adjusted as described in clause (iii), take into account how the local levels of performance compare with the local levels of performance established for other eligible recipients, considering factors including the characteristics of actual (as opposed to anticipated) CTE concentrators at the time those CTE concentrators entered the program, and the services or instruction to be provided; and

"(V) set the local levels of performance using valid and reliable data that measures—

"(aa) the differences within the State in actual economic conditions (including differences in unemployment rates and job losses or gains in particular industries); and

"(bb) the abilities of the State and the eligible recipient to collect and access valid, reliable, and cost-effective data.";

(IV) in clause (ii)—

(aa) in the clause heading, by striking "PLAN" and inserting "APPLICATION";

(bb) by striking "plan" and inserting "application"; and

(cc) by striking "the first 2" and inserting "each of the";

(V) by amending clause (iii), as redesignated by subclause (II), to read as follows:

"(iii) ALLOWABLE ADJUSTMENTS OF LOCAL LEVELS OF PERFORMANCE FOR SUBSEQUENT YEARS.—Prior to the third program year covered by the local application, the eligible recipient may, if the eligible recipient reaches an agreement with the eligible agency, adjust the local levels of performance for any of the core indicators of performance for the subsequent program years covered by the local application, in accordance with that agreement and with this subparagraph. The local adjusted levels of performance agreed to under this clause shall be considered to be the local levels of performance for the eligible recipient for such years and shall be incorporated into the local application."; and

(VI) in clause (v), as redesignated by subclause (II), by striking "If unanticipated circumstances arise with respect to an eligible recipient resulting in a significant change in the factors described in clause (v), the eligible recipient may request that the local adjusted levels of performance agreed to under clause (iii) or (iv) be revised." and inserting "If unanticipated circumstances arise, or changes occur related to improvements

in data or measurement approaches, the eligible recipient may request that the local levels of performance agreed to under clauses (i) and (iii) be revised.";

(ii) by striking subparagraph (B) and redesignating subparagraph (C) as subparagraph (B); and

(iii) in subparagraph (B), as redesignated by clause (ii)—

(I) in clause (i), by striking "the data described in clause (ii)(I), regarding the progress of such recipient in achieving the local adjusted levels of performance" and inserting "the data on the actual performance levels described in clause (ii), including the progress of such recipient in achieving the local levels of performance";

(II) in clause (ii)—

(aa) in subclause (I)—

(AA) by striking "section 1111(h)(1)(C)(i)" and inserting "section 1111(h)(1)(C)(ii)";

(BB) by striking "section 3(29)" and inserting "section 3(48)"; and

(CC) by striking "and" after the semicolon; and

(bb) in subclause (II)—

(AA) by inserting ", as described in paragraph 3(C)(ii)(II)," after "gaps in performance";

(BB) by inserting "as described in subclause (I) (including special populations)" after "category of students";

(CC) by striking "all students" and inserting "all CTE concentrators"; and

(DD) by adding at the end the following:

"(III) disaggregate data by the career and technical education programs or programs of study of the CTE concentrators, except that in a case in which reporting by such program or program of study is impractical, the data may be disaggregated by the career clusters of the CTE concentrators, if appropriate; and

"(IV) for CTE concentrators described in paragraph (2)(A)(iii) and paragraph (2)(B)(i), disaggregate data, to the extent such data is available, by each of the following:

"(aa) Individuals enrolled in postsecondary education (disaggregated by postsecondary award level, including certificate, associate, or baccalaureate degree).

"(bb) Individuals in advanced training.

"(cc) Individuals in military service or a service program that receives assistance under title I of the National and Community Service Act of 1990 (42 U.S.C. 12511 et seq.) or volunteers as described in section 5(a) of the Peace Corps Act (22 U.S.C. 2504(a)).

"(dd) Individuals in employment (including those individuals who are employed in a high-skill, high-wage, or in-demand sector or occupation).";

(III) in clause (iii), by striking "subsection (c)(3)" and inserting "paragraph (3)(C)(iii)";

(IV) in clause (iv), by striking "clause (ii)" and inserting "this paragraph"; and

(V) by striking clause (v) and inserting the following:

"(v) AVAILABILITY.—The report described in clause (i) shall be made available by the eligible recipient through a variety of formats, including electronically through the Internet, to students, parents, educators, and the public, and the information contained in such report shall be in a format that is understandable and uniform, and to the extent practicable, provided in a language that students, parents, and educators can understand."; and

(2) by striking subsection (c).

SEC. 113. NATIONAL ACTIVITIES.

Section 114 (20 U.S.C. 2324) is amended—

(1) in subsection (a)(1)—

(A) by striking "The Secretary shall" the first place it appears and inserting "The Secretary shall, in consultation with the Director,"; and

(B) by inserting "from eligible agencies under section 113(b)(3)(C)" after "pursuant to this title";

(2) by amending subsection (b) to read as follows:

"(b) REASONABLE COST.—The Secretary shall take such action as may be necessary to secure at reasonable cost the information required by this title. To ensure reasonable cost, the Secretary, in consultation with the National Center for Education Statistics and the Office of Career, Technical, and Adult Education shall determine the methodology to be used and the frequency with which such information is to be collected.";

(3) in subsection (c)—

(A) in paragraph (1), by striking "Secretary may" and inserting "Secretary shall";

(B) in paragraph (2)—

(i) in subparagraph (B), by inserting ", acting through the Director," after "describe how the Secretary"; and

(ii) in subparagraph (C), by inserting ", in consultation with the Director," after "Secretary";

(4) in subsection (d)—

(A) in paragraph (1)—

(i) in subparagraph (A)—

(I) by inserting ", acting through the Director," after "The Secretary";

(II) by inserting "and the plan developed under subsection (c)" after "described in paragraph (2)"; and

(III) by striking "assessment" each place such term appears and inserting "evaluation";

(ii) in subparagraph (B)—

(I) in clause (v), by striking "; and" and inserting a semicolon;

(II) in clause (vi)—

(aa) by inserting "qualified" before "intermediaries"; and

(bb) by striking the period at the end and inserting ", which may include individuals with expertise in addressing inequities in access to, and in opportunities for, academic and technical skill attainment;"; and

(III) by adding at the end the following:

"(vii) representatives of Indian Tribes and Tribal organizations; and

"(viii) representatives of special populations."; and

(iii) in subparagraph (C)—

(I) by inserting "the Director," after "the Secretary,"; and

(II) by striking "assessment" and inserting "evaluation";

(B) in paragraph (2)—

(i) in the heading, by striking "AND ASSESSMENT";

(ii) in subparagraph (A)—

(I) by striking "subsection (e), the Secretary" and inserting "subsection (f), the Secretary, acting through the Director,";

(II) by striking "an independent evaluation and assessment" and inserting "a series of research and evaluation initiatives for each year for which funds are appropriated to carry out this Act, which are aligned with the plan in subsection (c)(2),";

(III) by striking "Carl D. Perkins Career and Technical Education Improvement Act of 2006" and inserting "Strengthening Career and Technical Education for the 21st Century Act"; and

(IV) by adding at the end the following: "Whenever possible, data used for the evaluation for a fiscal year shall be data from the most recent fiscal year for which such data are available, and from the 5-year period preceding that fiscal year."; and

(iii) by amending subparagraph (B) to read as follows:

"(B) CONTENTS.—The evaluation required under subparagraph (A) shall include descriptions and evaluations of—

"(i) the extent and success of the integration of challenging State academic standards adopted under section 1111(b)(1) of the Elementary and Secondary Education Act of 1965 and career and technical education for students participating in career and technical education programs, including a review of the effect of such integration on the academic and technical proficiency achievement of such students, including—

"(I) the number of such students that receive a regular high school diploma, as such term is defined under section 8101 of the Elementary and Secondary Education Act of 1965 or a State-defined

alternative diploma described in section 8101(25)(A)(ii)(I)(bb) of such Act;

"(II) the number of such students that are high school students that receive a recognized postsecondary credential; and

"(III) the number of such students that are high school students that earn credit toward a recognized postsecondary credential;

"(ii) the extent to which career and technical education programs and programs of study prepare students, including special populations, for subsequent employment in high-skill, high-wage occupations (including those in which mathematics and science skills are critical, which may include computer science), or for participation in postsecondary education;

"(iii) employer involvement in, benefit from, and satisfaction with, career and technical education programs and programs of study and career and technical education students' preparation for employment;

"(iv) efforts to expand access to career and technical education programs of study for all students;

"(v) innovative approaches to work-based learning programs that increase participation and alignment with employment in high-growth industries, including in rural and low-income areas;

"(vi) the effectiveness of different delivery systems and approaches for career and technical education, including comprehensive high schools, technical high schools, area technical centers, career academies, community and technical colleges, early college high schools, pre-apprenticeship programs, voluntary afterschool programs, and individual course offerings, including dual or concurrent enrollment program courses, as well as communication strategies for promoting career and technical education opportunities involving teachers, school counselors, and parents or other guardians;

"(vii) the extent to which career and technical education programs supported by this Act are grounded on evidence-based research;

"(viii) the impact of the amendments to this Act made under the Strengthening Career and Technical Education for the 21st Century Act, including comparisons, where appropriate, of—

"(I) the use of the comprehensive needs assessment under section 134(c);

"(II) the implementation of programs of study; and

"(III) coordination of planning and program delivery with other relevant laws, including the Workforce Innovation and Opportunity Act (29 U.S.C. 3101 et seq.) and the Elementary and Secondary Education Act of 1965;

"(ix) changes in career and technical education program accountability as described in section 113 and any effects of such changes on program delivery and program quality;

"(x) changes in student enrollment patterns; and

"(xi) efforts to reduce disparities or performance gaps described in section 113(b)(3)(C)(ii)(II).."; and

(iv) in subparagraph (C)—

(I) in clause (i)—

(aa) in the matter preceding subclause (I), by inserting ", in consultation with the Director," after "The Secretary"; and

(bb) by striking subclauses (I) and (II) and inserting the following:

"(I) not later than 2 years after the date of enactment of the Strengthening Career and Technical Education for the 21st Century Act, an interim report regarding the evaluation and summary of research activities carried out under this section that builds on studies and analyses existing as of such date of enactment;

"(II) not later than 4 years after the date of enactment of the Strengthening Career and Technical Education for the 21st Century Act, a final report summarizing the studies and analyses that relate to the evaluation and summary of research activities carried out under this section; and

"(III) a biennial update to such final report for succeeding years.";

(II) in clause (ii), by inserting "the Director," after "the President, the Secretary," each place the term appears; and

(III) by adding after clause (ii) the following:

"(iii) DISSEMINATION.—In addition to submitting the reports required under clause (i), the Secretary shall disseminate the results of the evaluation widely and on a timely basis in order to increase the understanding among State and local officials and educators of the effectiveness of programs and activities supported under the Act and of the career and technical education programs and programs of study that are most likely to produce positive educational and employment outcomes.";

(C) in subparagraph (3)(A), by striking "State adjusted levels of performance described in section 113(b)" and inserting "State determined levels of performance described in section 113(b), as long as such information does not reveal any personally identifiable information"; and

(D) by striking paragraphs (4) and (5) and inserting the following:

"(4) RESEARCH.—

"(A) IN GENERAL.—From amounts made available under subsection (f), the Secretary, after consultation with the Director, the Commissioner for Education Research, and the States, and with input from the independent advisory panel established under subsection (d)(1)(A), shall award a grant, contract, or cooperative agreement, on a competitive basis, to an institution of higher education or to a consortium of one or more institutions of higher education and one or more private nonprofit organizations

or agencies, to carry out one or more of the activities described in subparagraph (B).

"(B) GRANT ACTIVITIES.—An institution or consortium receiving a grant under this paragraph shall use grant funds to carry out one or more of the following activities:

"(i) Evidence-based research and evaluation for the purpose of developing, improving, and identifying the most successful methods for—

"(I) eliminating inequities in access to, and in opportunities for, learning, skill development, or effective teaching in career and technical education programs; and

"(II) addressing the education, employment, and training needs of CTE participants, including special populations, in career and technical education programs or programs of study.

"(ii) Research on, and evaluation of, the impact of changes made by the Strengthening Career and Technical Education for the 21st Century Act, including State-by-State comparisons, where appropriate, of—

"(I) the use of the needs assessment under section 134(c);

"(II) the implementation of programs of study;

"(III) how States have implemented provisions of the Act, including both fiscal and programmatic elements;

"(IV) career and technical education funding and finance models; and

"(V) coordination with other relevant laws, including the Workforce Innovation and Opportunity Act (29 U.S.C. 3101 et seq.), the Elementary and Secondary Education Act of 1965, and the Higher Education Act of 1965.

"(iii) Evidence-based research and analyses that provide longitudinal information with respect to career and technical education programs and programs of study and student achievement.

"(iv) The implementation of, evaluation of, or evidence-based research of, innovative methods that support high-quality implementation of career and technical education programs and programs of study and student achievement related to career and technical education, including—

"(I) creating or expanding dual or concurrent enrollment program activities and early college high schools;

"(II) awarding of academic credit or academic alignment for industry recognized credentials, competency-based education, or work-based learning;

"(III) making available open, searchable, and comparable information on the quality of industry recognized credentials, including the related skills or competencies, attainment by CTE concentrators, related employment and earnings outcomes, labor market value, and use by employers; or

"(IV) initiatives to facilitate the transition of sub-baccalaureate career and technical education students into baccalaureate degree programs, including barriers affecting rural students and special populations.

"(C) REPORT.—The institution or consortium receiving a grant under this paragraph shall annually prepare a report containing information about the key research findings of such entity under this paragraph and shall submit copies of the report to the Secretary and the Director. The Secretary shall submit copies of the report to the relevant committees of Congress, the Library of Congress, and each eligible agency.

"(D) DISSEMINATION.—The institution or consortium receiving a grant under this paragraph shall conduct dissemination and training activities based on the research carried out under this paragraph on a timely basis, including through dissemination networks and, as appropriate and relevant, technical assistance providers within the Department.";

(5) by redesignating subsection (e) as subsection (f);

(6) by inserting after subsection (d) the following:

"(e) INNOVATION AND MODERNIZATION.—

"(1) GRANT PROGRAM.—To identify, support, and rigorously evaluate evidence-based and innovative strategies and activities to improve and modernize career and technical education and align workforce skills with labor market needs as part of the State plan under section 122 and local application under section 134 and the requirements of this subsection, the Secretary may use not more than 20 percent of the amounts appropriated under subsection (f) to award grants to eligible entities, eligible institutions, or eligible recipients to carry out the activities described in paragraph (7).

"(2) NON-FEDERAL MATCH.—

"(A) MATCHING FUNDS REQUIRED.—Except as provided under subparagraph (B), to receive a grant under this subsection, an eligible entity, eligible institution, or eligible recipient shall, through cash or in-kind contributions, provide matching funds from non-Federal sources in an amount equal to not less than 50 percent of the funds provided under such grant.

"(B) EXCEPTION.—The Secretary may waive the matching fund requirement under subparagraph (A) if the eligible entity, eligible institution, or eligible recipient demonstrates exceptional circumstances.

"(3) APPLICATION.—To receive a grant under this subsection, an eligible entity, eligible institution, or eligible recipient shall submit an application to the Secretary at such time, in such manner, and containing such information as the Secretary may require, including, at a minimum—

"(A) an identification and designation of the agency, institution, or school responsible for the administration and supervision of the program assisted under this paragraph;

"(B) a description of the budget for the project, the source and amount of the matching funds required under

paragraph (2)(A), and how the applicant will continue the project after the grant period ends, if applicable;

"(C) a description of how the applicant will use the grant funds, including how such funds will directly benefit students, including special populations, served by the applicant;

"(D) a description of how the program assisted under this subsection will be coordinated with the activities carried out under section 124 or 135;

"(E) a description of how the career and technical education programs or programs of study to be implemented with grant funds reflect the needs of regional, State, or local employers, as demonstrated by the comprehensive needs assessment under section 134(c);

"(F) a description of how the program assisted under this subsection will be evaluated and how that evaluation may inform the report described in subsection (d)(2)(C); and

"(G) an assurance that the applicant will—

"(i) provide information to the Secretary, as requested, for evaluations that the Secretary may carry out; and

"(ii) make data available to third parties for validation, in accordance with applicable data privacy laws, including section 444 of the General Education Provisions Act (20 U.S.C. 1232g, commonly known as the 'Family Educational Rights and Privacy Act of 1974').

"(4) PRIORITY.—In awarding grants under this subsection, the Secretary shall give priority to applications from eligible entities, eligible institutions, or eligible recipients that will predominantly serve students from low-income families.

"(5) GEOGRAPHIC DIVERSITY.—

"(A) IN GENERAL.—In awarding grants under this subsection, the Secretary shall award no less than 25 percent of the total available funds for any fiscal year to eligible entities, eligible institutions, or eligible recipients proposing to fund career and technical education activities that serve—

"(i) a local educational agency with an urban-centric district locale code of 32, 33, 41, 42, or 43, as determined by the Secretary;

"(ii) an institution of higher education primarily serving the one or more areas served by such a local educational agency;

"(iii) a consortium of such local educational agencies or such institutions of higher education;

"(iv) a partnership between—

"(I) an educational service agency or a nonprofit organization; and

"(II) such a local educational agency or such an institution of higher education; or

"(v) a partnership between—

"(I) a grant recipient described in clause (i) or (ii); and

"(II) a State educational agency.

"(B) EXCEPTION.—Notwithstanding subparagraph (A), the Secretary shall reduce the amount of funds made available under such clause if the Secretary does not receive a sufficient number of applications of sufficient quality.

"(6) DURATION.—

"(A) IN GENERAL.—Grants awarded under this subsection shall be for a period of not more than 3 years.

"(B) EXTENSION.—The Secretary may extend such grants for not more than 1 additional 2-year period if the grantee demonstrates to the Secretary that the grantee is achieving the grantee's program objectives and, as applicable, has improved education outcomes for career and technical education students, including special populations.

"(7) USES OF FUNDS.—An eligible entity, eligible institution, or eligible recipient that is awarded a grant under this subsection shall use the grant funds to create, develop, implement, replicate, or take to scale evidence-based, field-initiated innovations to modernize and improve effectiveness and alignment of career and technical education and to improve student outcomes in career and technical education, and rigorously evaluate such innovations, through one or more of the following activities:

"(A) Designing and implementing courses or programs of study aligned to labor market needs in new or emerging fields and working with industry to upgrade equipment, technology, and related curriculum used in career and technical education programs, which is needed for the development, expansion, and implementation of State-approved career and technical education programs of study, including—

"(i) the development or acquisition of instructional materials associated with the equipment and technology purchased by an eligible entity, eligible institution, or eligible recipient through the grant; or

"(ii) efforts to expand, develop, or implement programs designed to increase opportunities for students to take rigorous courses in coding or computer science subject areas, and support for statewide efforts to increase access and implementation of coding or computer science courses in order to meet local labor market needs in occupations that require skills in those subject areas.

"(B) Improving career and technical education outcomes of students served by eligible entities, eligible institutions, or eligible recipients through activities such as—

"(i) supporting the development and enhancement of innovative delivery models for career and technical education related work-based learning, including school-based simulated work sites, mentoring, work site visits, job shadowing, project-based learning, and skills-based and paid internships;

"(ii) increasing the effective use of technology within career and technical education programs and programs of study;

"(iii) supporting new models for integrating academic content at the secondary and postsecondary level in career and technical education; or

"(iv) integrating science, technology, engineering, and mathematics fields, including computer science education, with career and technical education.

"(C) Improving the transition of students—

"(i) from secondary education to postsecondary education or employment through programs, activities, or services that may include the creation, development, or expansion of dual or concurrent enrollment programs, articulation agreements, credit transfer agreements, and competency-based education; or

"(ii) from the completion of one postsecondary program to another postsecondary program that awards a recognized postsecondary credential.

"(D) Supporting the development and enhancement of innovative delivery models for career and technical education.

"(E) Working with industry to design and implement courses or programs of study aligned to labor market needs in new or emerging fields.

"(F) Supporting innovative approaches to career and technical education by redesigning the high school experience for students, which may include evidence-based transitional support strategies for students who have not met postsecondary education eligibility requirements.

"(G) Creating or expanding recruitment, retention, or professional development activities for career and technical education teachers, faculty, school leaders, administrators, specialized instructional support personnel, career guidance and academic counselors, and paraprofessionals, which may include—

"(i) providing resources and training to improve instruction for, and provide appropriate accommodations to, special populations;

"(ii) externships or site visits with business and industry;

"(iii) the integration of coherent and rigorous academic content standards and career and technical education curricula, including through opportunities for appropriate academic and career and technical education teachers to jointly develop and implement curricula and pedagogical strategies;

"(iv) mentoring by experienced teachers;

"(v) providing resources or assistance with meeting State teacher licensure and credential requirements; or

"(vi) training for career guidance and academic counselors at the secondary level to improve awareness of postsecondary education and postsecondary career options, and improve the ability of such counselors to communicate to students the career opportunities and employment trends.

"(H) Improving CTE concentrator employment outcomes in non-traditional fields.

"(I) Supporting the use of career and technical education programs and programs of study in a coordinated strategy to address identified employer needs and workforce shortages, such as shortages in the early childhood, elementary school, and secondary school education workforce.

"(J) Providing integrated student support that addresses the comprehensive needs of students, such as incorporating accelerated and differentiated learning opportunities supported by evidence-based strategies for special populations.

"(K) Establishing an online portal for career and technical education students, including special populations, preparing for postsecondary career and technical education, which may include opportunities for mentoring, gaining financial literacy skills, and identifying career opportunities and interests, and a platform to establish online savings accounts to be used exclusively for postsecondary career and technical education programs and programs of study.

"(L) Developing and implementing a pay for success initiative.

"(8) EVALUATION.—Each eligible entity, eligible institution, or eligible recipient receiving a grant under this subsection shall provide for an independent evaluation of the activities carried out using such grant and submit to the Secretary an annual report that includes—

"(A) a description of how funds received under this paragraph were used;

"(B) the performance of the eligible entity, eligible institution, or eligible recipient with respect to, at a minimum, the performance indicators described under section 113, as applicable, and disaggregated by—

"(i) subgroups of students described in section 1111(c)(2)(B) of the Elementary and Secondary Education Act of 1965;

"(ii) special populations; and

"(iii) as appropriate, each career and technical education program and program of study; and

"(C) a quantitative analysis of the effectiveness of the project carried out under this paragraph."; and

(7) by amending subsection (f), as redesignated by paragraph (5), to read as follows:

"(f) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this section—

"(1) $7,651,051 for fiscal year 2019;
"(2) $7,758,166 for fiscal year 2020;
"(3) $7,866,780 for fiscal year 2021;
"(4) $7,976,915 for fiscal year 2022;
"(5) $8,088,592 for fiscal year 2023; and
"(6) $8,201,832 for fiscal year 2024.".

SEC. 114. ASSISTANCE FOR THE OUTLYING AREAS.

Section 115 (20 U.S.C. 2325) is amended—

(1) in subsection (a)(3), by striking "subject to subsection (d)" and inserting "subject to subsection (b)";

(2) by striking subsections (b) and (c); and

(3) by redesignating subsection (d) as subsection (b).

SEC. 115. NATIVE AMERICAN PROGRAMS.

Section 116 (20 U.S.C. 2326) is amended—

(1) in subsection (a)—

(A) in paragraph (1), in the paragraph heading, by striking "NATIVE" and inserting "NATIVE";

(B) by striking paragraph (3);

(C) by redesignating paragraphs (4) and (5) as paragraphs (3) and (4), respectively;

(D) in paragraph (3) (as redesignated by subparagraph (C)), in the paragraph heading, by striking "HAWAIIAN" and inserting "HAWAIIAN"; and

(E) in paragraph (4) (as redesignated by subparagraph (C))—

(i) in the paragraph heading, by striking "HAWAIIAN" and inserting "HAWAIIAN"; and

(ii) by inserting "(20 U.S.C. 7517)" after "Act";

(2) in subsection (b)—

(A) in paragraph (1)—

(i) by striking "tribes" and inserting "Tribes"; and

(ii) by striking "tribal" and inserting "Tribal";

(B) in paragraph (2)—

(i) by striking the paragraph heading and inserting "INDIAN TRIBES AND TRIBAL ORGANIZATIONS.—";

(ii) by striking "Indian tribe or tribal organization" and inserting "Indian Tribe or Tribal organization";

(iii) by striking "450f" and inserting "5321"; and

(iv) by striking "455–457" and inserting "5345–5347";

(C) in paragraph (3)—

(i) in the paragraph heading, by striking "BUREAU OF INDIAN AFFAIRS" and inserting "BUREAU OF INDIAN EDUCATION";

(ii) by striking "tribe" and inserting "Tribe";

(iii) by striking "tribal" and inserting "Tribal"; and

(iv) by striking "Bureau of Indian Affairs" and inserting "Bureau of Indian Education";

(D) in paragraph (4)—

(i) by striking "Bureau of Indian Affairs" each place the term appears and inserting "Bureau of Indian Education"; and

(ii) by striking "Assistant Secretary of the Interior for Indian Affairs" and inserting "Director of the Bureau of Indian Education";

(E) in paragraph (5)(A), by striking "Indian tribes, tribal organizations, and individual tribal members" and inserting "Indian Tribes, Tribal organizations, and individual Tribal members"; and

(F) in paragraph (6)—

(i) by striking "tribe" each place the term appears and inserting "Tribe"; and

(ii) by striking "tribal" each place the term appears and inserting "Tribal";

(3) in subsection (c)—

(A) by redesignating paragraph (2) as paragraph (3); and

(B) by inserting after paragraph (1) the following:

"(2) SPECIAL RULE.—Notwithstanding section 3(5)(A)(iii), funds made available under this section may be used to provide preparatory, refresher, and remedial education services that are designed to enable students to achieve success in career and technical education programs or programs of study.";

(4) in subsection (d), by striking "tribe" each place the term appears and inserting "Tribe";

(5) in subsection (e)(1), by striking "tribal" and inserting "Tribal";

(6) in subsection (f), by striking "tribe" and inserting "Tribe"; and

(7) in subsection (g), by striking "tribe" each place the term appears and inserting "Tribe".

SEC. 116. TRIBALLY CONTROLLED POSTSECONDARY CAREER AND TECHNICAL INSTITUTIONS.

Section 117 (20 U.S.C. 2327) is amended—

(1) in subsection (a)(2), by striking "(25 U.S.C. 640a et seq.)" and inserting "(Public Law 92–189; 85 Stat. 646)";

(2) in subsection (d), by striking "(25 U.S.C. 640a et seq.)" and inserting "(Public Law 92–189; 85 Stat. 646)";

(3) in subsection (f)(3), by striking "tribe" each place the term appears and inserting "Tribe";

(4) in subsection (h)—

(A) in the paragraph heading, by striking "INDIAN TRIBE" and inserting "INDIAN TRIBE"; and

(B) by striking "terms 'Indian' and 'Indian tribe' have the meanings given the terms in" and inserting "terms 'Indian' and 'Indian Tribe' have the meanings given the terms 'Indian' and 'Indian tribe', respectively, in"; and

(5) by striking subsection (i) and inserting the following:

"(i) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this section—

"(1) $9,762,539 for fiscal year 2019;

"(2) $9,899,215 for fiscal year 2020;

"(3) $10,037,804 for fiscal year 2021;

"(4) $10,178,333 for fiscal year 2022;

"(5) $10,320,829 for fiscal year 2023; and

"(6) $10,465,321 for fiscal year 2024.".

SEC. 117. OCCUPATIONAL AND EMPLOYMENT INFORMATION.

Section 118 (20 U.S.C. 2328) is repealed.

PART B—STATE PROVISIONS

SEC. 121. STATE ADMINISTRATION.

Section 121(a)(2) (20 U.S.C. 2341(a)(2)) is amended by striking "parents" and all that follows through the end of the paragraph and inserting "teachers, faculty, specialized instructional support personnel, paraprofessionals, school leaders, authorized public chartering agencies and charter school leaders (consistent with State law), employers, representatives of business (including small businesses), labor organizations, eligible recipients, local program administrators, State and local officials, Indian Tribes or Tribal organizations present in the State, parents, students, and community organizations;".

SEC. 122. STATE PLAN.

Section 122 (20 U.S.C. 2342) is amended—

(1) in subsection (a)—

(A) in paragraph (1)—

(i) by striking "6-year period," and inserting "4-year period, consistent with subsection (b) and paragraph (5),"; and

(ii) by striking "Carl D. Perkins Career and Technical Education Improvement Act of 2006" and inserting "Strengthening Career and Technical Education for the 21st Century Act";

(B) in paragraph (2)(B), by striking "6-year period" and inserting "4-year period";

(C) in paragraph (3), by striking "(including charter school" and all that follows through "and community organizations)" and inserting "(including teachers, faculty, specialized instructional support personnel, paraprofessionals, school leaders, authorized public chartering agencies and charter school leaders (consistent with State law), employers, labor organizations, parents, students, Indian Tribes and Tribal organizations that may be present in the State, and community organizations)"; and

(D) by adding at the end the following:

"(4) PUBLIC COMMENT.—Each eligible agency shall make the State plan publicly available for public comment for a period of not less than 30 days, by electronic means and in an easily accessible format, prior to submission to the Secretary for approval under this subsection. In the plan the eligible agency files under this subsection, the eligible agency shall provide an assurance that public comments were taken into account in the development of the State plan.

"(5) OPTIONAL SUBMISSION OF SUBSEQUENT PLANS.—An eligible agency may, after the first 4-year State plan is submitted under this section, submit subsequent 4-year plans not later than 120 days prior to the end of the 4-year period covered by the preceding State plan or, if an eligible agency chooses not to submit a State plan for a subsequent 4-year period, the eligible agency shall submit, and the Secretary shall approve, annual revisions to the State determined levels of performance in the same manner as revisions submitted and approved under section 113(b)(3)(A)(ii).";

(2) by striking subsections (b) through (e) and inserting the following:

"(b) OPTIONS FOR SUBMISSION OF STATE PLAN.—

"(1) COMBINED PLAN.—The eligible agency may submit a combined plan that meets the requirements of this section and the requirements of section 103 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3113).

"(2) NOTICE TO SECRETARY.—The eligible agency shall inform the Secretary of whether the eligible agency intends to submit a combined plan described in paragraph (1) or a single plan.

"(c) PLAN DEVELOPMENT.—

"(1) IN GENERAL.—The eligible agency shall—

"(A) develop the State plan in consultation with—

"(i) representatives of secondary and postsecondary career and technical education programs, including

eligible recipients and representatives of 2-year minority-serving institutions and historically Black colleges and universities and tribally controlled colleges or universities in States where such institutions are in existence, adult career and technical education providers, and charter school representatives in States where such schools are in existence, which shall include teachers, faculty, school leaders, specialized instructional support personnel, career and academic guidance counselors, and paraprofessionals;

"(ii) interested community representatives, including parents, students, and community organizations;

"(iii) representatives of the State workforce development board established under section 101 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3111) (referred to in this section as the 'State board');

"(iv) members and representatives of special populations;

"(v) representatives of business and industry (including representatives of small business), which shall include representatives of industry and sector partnerships in the State, as appropriate, and representatives of labor organizations in the State;

"(vi) representatives of agencies serving out-of-school youth, homeless children and youth, and at-risk youth, including the State Coordinator for Education of Homeless Children and Youths established or designated under section 722(d)(3) of the McKinney-Vento Homeless Assistance Act (42 U.S.C. 11432(d)(3));

"(vii) representatives of Indian Tribes and Tribal organizations located in, or providing services in, the State; and

"(viii) individuals with disabilities; and

"(B) consult the Governor of the State, and the heads of other State agencies with authority for career and technical education programs that are not the eligible agency, with respect to the development of the State plan.

"(2) ACTIVITIES AND PROCEDURES.—The eligible agency shall develop effective activities and procedures, including access to information needed to use such procedures, to allow the individuals and entities described in paragraph (1) to participate in State and local decisions that relate to development of the State plan.

"(3) CONSULTATION WITH THE GOVERNOR.—The consultation described in paragraph (1)(B) shall include meetings of officials from the eligible agency and the Governor's office and shall occur—

"(A) during the development of such plan; and

"(B) prior to submission of the plan to the Secretary.

"(d) PLAN CONTENTS.—The State plan shall include—

"(1) a summary of State-supported workforce development activities (including education and training) in the State, including the degree to which the State's career and technical education programs and programs of study are aligned with

and address the education and skill needs of the employers in the State identified by the State board;

"(2) the State's strategic vision and set of goals for preparing an educated and skilled workforce (including special populations) and for meeting the skilled workforce needs of employers, including in existing and emerging in-demand industry sectors and occupations as identified by the State, and how the State's career and technical education programs will help to meet these goals;

"(3) a strategy for any joint planning, alignment, coordination, and leveraging of funds—

"(A) between the State's career and technical education programs and programs of study with the State's workforce development system, to achieve the strategic vision and goals described in paragraph (2), including the core programs defined in section 3 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3102) and the elements related to system alignment under section 102(b)(2)(B) of such Act (29 U.S.C. 3112(b)(2)(B)); and

"(B) for programs carried out under this title with other Federal programs, which may include programs funded under the Elementary and Secondary Education Act of 1965 and the Higher Education Act of 1965;

"(4) a description of the career and technical education programs or programs of study that will be supported, developed, or improved at the State level, including descriptions of—

"(A) the programs of study to be developed at the State level and made available for adoption by eligible recipients;

"(B) the process and criteria to be used for approving locally developed programs of study or career pathways, including how such programs address State workforce development and education needs and the criteria to assess the extent to which the local application under section 132 will—

"(i) promote continuous improvement in academic achievement and technical skill attainment;

"(ii) expand access to career and technical education for special populations; and

"(iii) support the inclusion of employability skills in programs of study and career pathways;

"(C) how the eligible agency will—

"(i) make information on approved programs of study and career pathways (including career exploration, work-based learning opportunities, early college high schools, and dual or concurrent enrollment program opportunities) and guidance and advisement resources, available to students (and parents, as appropriate), representatives of secondary and postsecondary education, and special populations, and to the extent practicable, provide that information and those resources in a language students, parents, and educators can understand;

"(ii) facilitate collaboration among eligible recipients in the development and coordination of career and technical education programs and programs of

study and career pathways that include multiple entry and exit points;

"(iii) use State, regional, or local labor market data to determine alignment of eligible recipients' programs of study to the needs of the State, regional, or local economy, including in-demand industry sectors and occupations identified by the State board, and to align career and technical education with such needs, as appropriate;

"(iv) ensure equal access to approved career and technical education programs of study and activities assisted under this Act for special populations;

"(v) coordinate with the State board to support the local development of career pathways and articulate processes by which career pathways will be developed by local workforce development boards, as appropriate;

"(vi) support effective and meaningful collaboration between secondary schools, postsecondary institutions, and employers to provide students with experience in, and understanding of, all aspects of an industry, which may include work-based learning such as internships, mentorships, simulated work environments, and other hands-on or inquiry-based learning activities; and

"(vii) improve outcomes and reduce performance gaps for CTE concentrators, including those who are members of special populations; and

"(D) how the eligible agency may include the opportunity for secondary school students to participate in dual or concurrent enrollment programs, early college high school, or competency-based education;

"(5) a description of the criteria and process for how the eligible agency will approve eligible recipients for funds under this Act, including how—

"(A) each eligible recipient will promote academic achievement;

"(B) each eligible recipient will promote skill attainment, including skill attainment that leads to a recognized postsecondary credential; and

"(C) each eligible recipient will ensure the comprehensive needs assessment under section 134(c) takes into consideration local economic and education needs, including, where appropriate, in-demand industry sectors and occupations;

"(6) a description of how the eligible agency will support the recruitment and preparation of teachers, including special education teachers, faculty, school principals, administrators, specialized instructional support personnel, and paraprofessionals to provide career and technical education instruction, leadership, and support, including professional development that provides the knowledge and skills needed to work with and improve instruction for special populations;

"(7) a description of how the eligible agency will use State leadership funds under section 124;

"(8) a description of how funds received by the eligible agency through the allotment made under section 111 will be distributed—

"(A) among career and technical education at the secondary level, or career and technical education at the postsecondary and adult level, or both, including how such distribution will most effectively provide students with the skills needed to succeed in the workplace; and

"(B) among any consortia that may be formed among secondary schools and eligible institutions, and how funds will be distributed among the members of the consortia, including the rationale for such distribution and how it will most effectively provide students with the skills needed to succeed in the workplace;

"(9) a description of the eligible agency's program strategies for special populations, including a description of how individuals who are members of special populations—

"(A) will be provided with equal access to activities assisted under this Act;

"(B) will not be discriminated against on the basis of status as a member of a special population;

"(C) will be provided with programs designed to enable individuals who are members of special populations to meet or exceed State determined levels of performance described in section 113, and prepare special populations for further learning and for high-skill, high-wage, or in-demand industry sectors or occupations;

"(D) will be provided with appropriate accommodations; and

"(E) will be provided instruction and work-based learning opportunities in integrated settings that support competitive, integrated employment;

"(10) a description of the procedure the eligible agency will adopt for determining State determined levels of performance described in section 113, which, at a minimum, shall include—

"(A) a description of the process for public comment under section 113(b)(3)(B) as part of the development of the State determined levels of performance under section 113(b);

"(B) an explanation of the State determined levels of performance; and

"(C) a description of how the State determined levels of performance set by the eligible agency align with the levels, goals, and objectives of other Federal and State laws;

"(11) a description of how the eligible agency will address disparities or gaps in performance, as described in section 113(b)(3)(C)(ii)(II), in each of the plan years, and if no meaningful progress has been achieved prior to the third program year, a description of the additional actions the eligible agency will take to eliminate these disparities or gaps;

"(12) describes how the eligible agency will involve parents, academic and career and technical education teachers, administrators, faculty, career guidance and academic counselors, local business (including small businesses), labor organizations, and representatives of Indian Tribes and Tribal organizations, as appropriate, in the planning, development, implementation, and evaluation of such career and technical education programs; and

"(13) assurances that—

"(A) the eligible agency will comply with the requirements of this Act and the provisions of the State plan, including the provision of a financial audit of funds received under this Act, which may be included as part of an audit of other Federal or State programs;

"(B) none of the funds expended under this Act will be used to acquire equipment (including computer software) in any instance in which such acquisition results in a direct financial benefit to any organization representing the interests of the acquiring entity or the employees of the acquiring entity, or any affiliate of such an organization;

"(C) the eligible agency will use the funds to promote preparation for high-skill, high-wage, or in-demand industry sectors or occupations and non-traditional fields, as identified by the eligible agency;

"(D) the eligible agency will use the funds provided under this Act to implement career and technical education programs and programs of study for individuals in State correctional institutions, including juvenile justice facilities; and

"(E) the eligible agency will provide local educational agencies, area career and technical education schools, and eligible institutions in the State with technical assistance, including technical assistance on how to close gaps in student participation and performance in career and technical education programs; and

"(14) a description of the opportunities for the public to comment in person and in writing on the State plan under this subsection.

"(e) CONSULTATION.—

"(1) IN GENERAL.—The eligible agency shall develop the portion of each State plan relating to the amount and uses of any funds proposed to be reserved for adult career and technical education, postsecondary career and technical education, and secondary career and technical education after consultation with—

"(A) the State agency responsible for supervision of community colleges, technical institutes, other 2-year postsecondary institutions primarily engaged in providing postsecondary career and technical education, or, where applicable, institutions of higher education that are engaged in providing postsecondary career and technical education as part of their mission;

"(B) the State agency responsible for secondary education; and

"(C) the State agency responsible for adult education.

"(2) OBJECTIONS OF STATE AGENCIES.—If a State agency other than the eligible agency finds that a portion of the final State plan is objectionable, that objection shall be filed together with the State plan. The eligible agency shall respond to any objections of such State agency in the State plan submitted to the Secretary.

"(3) JOINT SIGNATURE AUTHORITY.—A Governor shall have 30 days prior to the eligible agency submitting the State plan to the Secretary to sign such plan. If the Governor has not

signed the plan within 30 days of delivery by the eligible agency to the Governor, the eligible agency shall submit the plan to the Secretary without such signature.

"(f) PLAN APPROVAL.—

"(1) IN GENERAL.—Not later than 120 days after the eligible agency submits its State plan, the Secretary shall approve such State plan, or a revision of the plan under subsection (a)(2) (including a revision of State determined levels of performance in accordance with section 113(b)(3)(A)(iii)), if the Secretary determines that the State has submitted in its State plan State determined levels of performance that meet the criteria established in section 113(b)(3), including the minimum requirements described in section 113(b)(3)(A)(i)(III), unless the Secretary—

"(A) determines that the State plan does not meet the requirements of this Act, including the minimum requirements as described in section 113(b)(3)(A)(i)(III); and

"(B) meets the requirements of paragraph (2) with respect to such plan.

"(2) DISAPPROVAL.—The Secretary—

"(A) shall have the authority to disapprove a State plan only if the Secretary—

"(i) determines how the State plan fails to meet the requirements of this Act; and

"(ii) provides to the eligible agency, in writing, notice of such determination and the supporting information and rationale to substantiate such determination; and

"(B) shall not finally disapprove a State plan, except after making the determination and providing the information described in subparagraph (A), and giving the eligible agency notice and an opportunity for a hearing.".

SEC. 123. IMPROVEMENT PLANS.

Section 123 (20 U.S.C. 2343) is amended—

(1) in subsection (a)—

(A) in paragraph (1)—

(i) by striking "percent of an agreed upon" and inserting "percent of the";

(ii) by striking "State adjusted level of performance" and inserting "State determined level of performance" each place the term appears;

(iii) by striking "section 113(b)(3)" and inserting "113(b)(2) for all CTE concentrators";

(iv) by striking "(with special consideration to performance gaps identified under section 113(c)(2))" and inserting "(that includes an analysis of the performance disparities or gaps identified under section 113(b)(3)(C)(ii)(II), and actions that will be taken to address such gaps)";

(B) in paragraph (2)—

(i) by striking "State's adjusted levels of performance" and inserting "State determined levels of performance"; and

(ii) by striking "purposes of this Act" and inserting "purposes of this section, including after implementation of the improvement plan described in paragraph (1),";

(C) in paragraph (3)(A)—

(i) in clause (i), by inserting "or" after the semicolon; and

(ii) by striking clauses (ii) and (iii) and inserting the following:

"(ii) with respect to any specific core indicator of performance that was identified in a program improvement plan under paragraph (1), fails to meet at least 90 percent of a State determined level of performance for such core indicator for 2 consecutive years after the eligible agency has been identified for improvement under such paragraph."; and

(D) by adding at the end the following:

"(5) ADJUSTMENTS PROHIBITED.—An eligible agency shall not be eligible to adjust performance levels while executing an improvement plan under this section."; and

(2) in subsection (b)—

(A) by striking "adjusted" each place the term appears;

(B) in paragraph (2)—

(i) by inserting "for all CTE concentrators" after "section 113(b)(4)"; and

(ii) by striking "(with special consideration to performance gaps identified under section 113(b)(4)(C)(ii)(II) in consultation with the eligible agency," and inserting "(that includes an analysis of the performance disparities or gaps identified under section 113(b)(3)(C)(ii)(II), and actions that will be taken to address such gaps) in consultation with local stakeholders described in section 134(d)(1), the eligible agency, and";

(C) in paragraph (4)—

(i) in subparagraph (A)—

(I) in clause (i), by inserting "or" after the semicolon; and

(II) by striking clauses (ii) and (iii) and inserting the following:

"(ii) with respect to any specific core indicator of performance that was identified in a program improvement plan under paragraph (2), fails to meet at least 90 percent of the local level of performance for such core indicator for 2 consecutive years after the eligible recipient has been identified for improvement under such paragraph."; and

(ii) in subparagraph (B)—

(I) in clause (i), by striking "or" after the semicolon;

(II) in clause (ii), by striking the period at the end and inserting "; or"; and

(III) by adding at the end the following:

"(iii) in response to a public request from an eligible recipient, if the eligible agency determines that the requirements described in clause (i) or (ii) have been met."; and

(D) by adding at the end the following:

"(6) ADJUSTMENTS PROHIBITED.—An eligible recipient shall not be eligible to adjust performance levels while executing an improvement plan under this section.".

SEC. 124. STATE LEADERSHIP ACTIVITIES.

Section 124 (20 U.S.C. 2344) is amended—

(1) in subsection (a), by striking "shall conduct State leadership activities." and inserting "shall—

"(1) conduct State leadership activities to improve career and technical education, which shall include support for—

"(A) preparation for non-traditional fields in current and emerging professions, programs for special populations, and other activities that expose students, including special populations, to high-skill, high-wage, and in-demand occupations;

"(B) individuals in State institutions, such as State correctional institutions, including juvenile justice facilities, and educational institutions that serve individuals with disabilities;

"(C) recruiting, preparing, or retaining career and technical education teachers, faculty, specialized instructional support personnel, or paraprofessionals, such as preservice, professional development, or leadership development programs; and

"(D) technical assistance for eligible recipients; and

"(2) report on the effectiveness of such use of funds in achieving the goals described in section 122(d)(2) and the State determined levels of performance described in section 113(b)(3)(A), and reducing disparities or performance gaps as described in section 113(b)(3)(C)(ii)(II).";

(2) in subsection (b)—

(A) in the subsection heading, by striking "REQUIRED" and inserting "PERMISSIBLE";

(B) in the matter preceding paragraph (1), by striking "shall" and inserting "may"; and

(C) by striking paragraphs (1) through (9) and inserting the following:

"(1) developing statewide programs of study, which may include standards, curriculum, and course development, and career exploration, guidance, and advisement activities and resources;

"(2) approving locally developed programs of study that meet the requirements established in section 122(d)(4)(B);

"(3) establishing statewide articulation agreements aligned to approved programs of study;

"(4) establishing statewide industry or sector partnerships among local educational agencies, institutions of higher education, adult education providers, Indian Tribes and Tribal organizations that may be present in the State, employers, including small businesses, and parents, as appropriate to—

"(A) develop and implement programs of study aligned to State and local economic and education needs, including, as appropriate, in-demand industry sectors and occupations;

"(B) facilitate the establishment, expansion, and integration of opportunities for students at the secondary level to—

"(i) successfully complete coursework that integrates rigorous and challenging technical and academic instruction aligned with the challenging State academic standards adopted by the State under section 1111(b)(1) of the Elementary and Secondary Education Act of 1965; and

"(ii) earn a recognized postsecondary credential or credit toward a recognized postsecondary credential, which may be earned through a dual or concurrent enrollment program or early college high school, at no cost to the student or the student's family; and

"(C) facilitate work-based learning opportunities (including internships, externships, and simulated work environments) into programs of study;

"(5) for teachers, faculty, specialized instructional support personnel, and paraprofessionals providing career and technical education instruction, support services, and specialized instructional support services, high-quality comprehensive professional development that is, to the extent practicable, grounded in evidence-based research (to the extent a State determines that such evidence is reasonably available) that identifies the most effective educator professional development process and is coordinated and aligned with other professional development activities carried out by the State (including under title II of the Elementary and Secondary Education Act of 1965 and title II of the Higher Education Act of 1965), including programming that—

"(A) promotes the integration of the challenging State academic standards adopted by the State under section 1111(b)(1) of the Elementary and Secondary Education Act of 1965 and relevant technical knowledge and skills, including programming jointly delivered to academic and career and technical education teachers;

"(B) prepares career and technical education teachers, faculty, specialized instructional support personnel, and paraprofessionals to provide appropriate accommodations for students who are members of special populations, including through the use of principles of universal design for learning, multi-tier systems of supports, and positive behavioral interventions and support; and

"(C) increases the ability of teachers, faculty, specialized instructional support personnel, and paraprofessionals providing career and technical education instruction to stay current with industry standards and earn an industry-recognized credential or license, as appropriate, including by assisting those with relevant industry experience in obtaining State teacher licensure or credential requirements;

"(6) supporting eligible recipients in eliminating inequities in student access to—

"(A) high-quality programs of study that provide skill development; and

"(B) effective teachers, faculty, specialized instructional support personnel, and paraprofessionals;

"(7) awarding incentive grants to eligible recipients—

"(A) for exemplary performance in carrying out programs under this Act, which awards shall be based on—

"(i) eligible recipients exceeding the local level of performance on a core indicator of performance established under section 113(b)(4)(A) in a manner that reflects sustained or significant improvement;

"(ii) eligible recipients effectively developing connections between secondary education and postsecondary education and training;

"(iii) the integration of academic and technical standards;

"(iv) eligible recipients' progress in closing achievement gaps among subpopulations who participate in programs of study; or

"(v) other factors relating to the performance of eligible recipients under this Act as the eligible agency determines are appropriate; or

"(B) if an eligible recipient elects to use funds as permitted under section 135(c);

"(8) providing support for—

"(A) the adoption and integration of recognized postsecondary credentials and work-based learning into programs of study, and for increasing data collection associated with recognized postsecondary credentials and employment outcomes; or

"(B) consultation and coordination with other State agencies for the identification and examination of licenses or certifications that—

"(i) pose an unwarranted barrier to entry into the workforce for career and technical education students; and

"(ii) do not protect the health, safety, or welfare of consumers;

"(9) the creation, implementation, and support of pay for success initiatives leading to a recognized postsecondary credential;

"(10) support for career and technical education programs for adults and out-of-school youth concurrent with their completion of their secondary school education in a school or other educational setting;

"(11) the creation, evaluation, and support of competency-based curricula;

"(12) support for the development, implementation, and expansion of programs of study or career pathways in areas declared to be in a state of emergency under section 501 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5191);

"(13) partnering with qualified intermediaries to improve training, the development of public-private partnerships, systems development, capacity-building, and scalability of the delivery of high-quality career and technical education;

"(14) improvement of career guidance and academic counseling programs that assist students in making informed academic and career and technical education decisions, including academic and financial aid counseling;

"(15) support for the integration of employability skills into career and technical education programs and programs of study;

"(16) support for programs and activities that increase access, student engagement, and success in science, technology, engineering, and mathematics fields (including computer science, coding, and architecture), support for the integration of arts and design skills, and support for hands-on learning, particularly for students who are members of groups underrepresented in such subject fields, such as female students, minority students, and students who are members of special populations;

"(17) support for career and technical student organizations, especially with respect to efforts to increase the participation of students in nontraditional fields and students who are members of special populations;

"(18) support for establishing and expanding work-based learning opportunities that are aligned to career and technical education programs and programs of study;

"(19) integrating and aligning programs of study and career pathways;

"(20) supporting the use of career and technical education programs and programs of study aligned with State, regional, or local high-skill, high-wage, or in-demand industry sectors or occupations identified by the State workforce development board described in section 101 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3111) or local workforce development boards;

"(21) making all forms of instructional content widely available, which may include use of open educational resources;

"(22) developing valid and reliable assessments of competencies and technical skills and enhancing data systems to collect and analyze data on secondary and postsecondary academic and employment outcomes;

"(23) support for accelerated learning programs, as described in section 4104(b)(3)(A)(i)(IV) of the Elementary and Secondary Education Act of 1965, in the case of any such program that is part of a career and technical education program of study;

"(24) support for career academies to implement a postsecondary education and workforce-ready curriculum at the secondary education level that integrates rigorous academic, technical, and employability contents through career and technical education programs and programs of study that address needs described in the comprehensive needs assessment under section 134(c); and

"(25) other State leadership activities that improve career and technical education.";

(3) by striking subsection (c);

(4) by redesignating subsection (d) as subsection (c); and

(5) in subsection (c), as redesignated by paragraph (4), by striking the period at the end and inserting ", unless expressly authorized under subsection (a).".

PART C—LOCAL PROVISIONS

SEC. 131. DISTRIBUTION OF FUNDS TO SECONDARY EDUCATION PROGRAMS.

Section 131 (20 U.S.C. 2351) is amended—

(1) in subsection (a)(3)(B), by striking "Bureau of Indian Affairs" and inserting "Bureau of Indian Education";

(2) in subsection (c)(2)(A)(ii), by inserting "or programs of study" after "technical education programs";

(3) in subsection (g), by inserting "and programs of study" after "technical education programs"; and

(4) in subsection (h), by striking "Bureau of Indian Affairs" and inserting "Bureau of Indian Education".

SEC. 132. SPECIAL RULES FOR CAREER AND TECHNICAL EDUCATION.

Section 133 (20 U.S.C. 2353) is amended by inserting "or programs of study" after "career and technical education programs" each place the term appears.

SEC. 133. LOCAL APPLICATION FOR CAREER AND TECHNICAL EDUCATION PROGRAMS.

Section 134 (20 U.S.C. 2354) is amended—

(1) in the section heading, by striking "**LOCAL PLAN**" and inserting "**LOCAL APPLICATION**";

(2) in subsection (a)—

(A) in the subsection heading, by striking "LOCAL PLAN" and inserting "LOCAL APPLICATION";

(B) by striking "submit a local plan" and inserting "submit a local application"; and

(C) by striking "Such local plan" and inserting "Such local application"; and

(3) by striking subsection (b) and inserting the following:

"(b) CONTENTS.—The eligible agency shall determine the requirements for local applications, except that each local application shall contain—

"(1) a description of the results of the comprehensive needs assessment conducted under subsection (c);

"(2) information on the career and technical education course offerings and activities that the eligible recipient will provide with funds under this part, which shall include not less than 1 program of study approved by a State under section 124(b)(2), including—

"(A) how the results of the comprehensive needs assessment described in subsection (c) informed the selection of the specific career and technical education programs and activities selected to be funded;

"(B) a description of any new programs of study the eligible recipient will develop and submit to the State for approval; and

"(C) how students, including students who are members of special populations, will learn about their school's career and technical education course offerings and whether each course is part of a career and technical education program of study;

"(3) a description of how the eligible recipient, in collaboration with local workforce development boards and other local

workforce agencies, one-stop delivery systems described in section 121(e)(2) of the Workforce Innovation and Opportunity Act (29 U.S.C. 3151(e)(2)), and other partners, will provide—

"(A) career exploration and career development coursework, activities, or services;

"(B) career information on employment opportunities that incorporate the most up-to-date information on high-skill, high-wage, or in-demand industry sectors or occupations, as determined by the comprehensive needs assessment described in subsection (c); and

"(C) an organized system of career guidance and academic counseling to students before enrolling and while participating in a career and technical education program;

"(4) a description of how the eligible recipient will improve the academic and technical skills of students participating in career and technical education programs by strengthening the academic and career and technical education components of such programs through the integration of coherent and rigorous content aligned with challenging academic standards and relevant career and technical education programs to ensure learning in the subjects that constitute a well-rounded education (as defined in section 8101 of the Elementary and Secondary Education Act of 1965);

"(5) a description of how the eligible recipient will—

"(A) provide activities to prepare special populations for high-skill, high-wage, or in-demand industry sectors or occupations that will lead to self-sufficiency;

"(B) prepare CTE participants for non-traditional fields;

"(C) provide equal access for special populations to career and technical education courses, programs, and programs of study; and

"(D) ensure that members of special populations will not be discriminated against on the basis of their status as members of special populations;

"(6) a description of the work-based learning opportunities that the eligible recipient will provide to students participating in career and technical education programs and how the recipient will work with representatives from employers to develop or expand work-based learning opportunities for career and technical education students, as applicable;

"(7) a description of how the eligible recipient will provide students participating in career and technical education programs with the opportunity to gain postsecondary credit while still attending high school, such as through dual or concurrent enrollment programs or early college high school, as practicable;

"(8) a description of how the eligible recipient will coordinate with the eligible agency and institutions of higher education to support the recruitment, preparation, retention, and training, including professional development, of teachers, faculty, administrators, and specialized instructional support personnel and paraprofessionals who meet applicable State certification and licensure requirements (including any requirements met through alternative routes to certification), including individuals from groups underrepresented in the teaching profession; and

"(9) a description of how the eligible recipient will address disparities or gaps in performance as described in section 113(b)(3)(C)(ii)(II) in each of the plan years, and if no meaningful progress has been achieved prior to the third program year, a description of the additional actions such recipient will take to eliminate those disparities or gaps.

"(c) COMPREHENSIVE NEEDS ASSESSMENT.—

"(1) IN GENERAL.—To be eligible to receive financial assistance under this part, an eligible recipient shall—

"(A) conduct a comprehensive local needs assessment related to career and technical education and include the results of the needs assessment in the local application submitted under subsection (a); and

"(B) not less than once every 2 years, update such comprehensive local needs assessment.

"(2) REQUIREMENTS.—The comprehensive local needs assessment described in paragraph (1) shall include each of the following:

"(A) An evaluation of the performance of the students served by the eligible recipient with respect to State determined and local levels of performance established pursuant to section 113, including an evaluation of performance for special populations and each subgroup described in section 1111(h)(1)(C)(ii) of the Elementary and Secondary Education Act of 1965.

"(B) A description of how career and technical education programs offered by the eligible recipient are—

"(i) sufficient in size, scope, and quality to meet the needs of all students served by the eligible recipient; and

"(ii)(I) aligned to State, regional, Tribal, or local in-demand industry sectors or occupations identified by the State workforce development board described in section 101 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3111) (referred to in this section as the 'State board') or local workforce development board, including career pathways, where appropriate; or

"(II) designed to meet local education or economic needs not identified by State boards or local workforce development boards.

"(C) An evaluation of progress toward the implementation of career and technical education programs and programs of study.

"(D) A description of how the eligible recipient will improve recruitment, retention, and training of career and technical education teachers, faculty, specialized instructional support personnel, paraprofessionals, and career guidance and academic counselors, including individuals in groups underrepresented in such professions.

"(E) A description of progress toward implementation of equal access to high-quality career and technical education courses and programs of study for all students, including—

"(i) strategies to overcome barriers that result in lower rates of access to, or performance gaps in, the courses and programs for special populations;

"(ii) providing programs that are designed to enable special populations to meet the local levels of performance; and

"(iii) providing activities to prepare special populations for high-skill, high-wage, or in-demand industry sectors or occupations in competitive, integrated settings that will lead to self-sufficiency.

"(d) CONSULTATION.—In conducting the comprehensive needs assessment under subsection (c), and developing the local application described in subsection (b), an eligible recipient shall involve a diverse body of stakeholders, including, at a minimum—

"(1) representatives of career and technical education programs in a local educational agency or educational service agency, including teachers, career guidance and academic counselors, principals and other school leaders, administrators, and specialized instructional support personnel and paraprofessionals;

"(2) representatives of career and technical education programs at postsecondary educational institutions, including faculty and administrators;

"(3) representatives of the State board or local workforce development boards and a range of local or regional businesses or industries;

"(4) parents and students;

"(5) representatives of special populations;

"(6) representatives of regional or local agencies serving out-of-school youth, homeless children and youth, and at-risk youth (as defined in section 1432 of the Elementary and Secondary Education Act of 1965);

"(7) representatives of Indian Tribes and Tribal organizations in the State, where applicable; and

"(8) any other stakeholders that the eligible agency may require the eligible recipient to consult.

"(e) CONTINUED CONSULTATION.—An eligible recipient receiving financial assistance under this part shall consult with stakeholders described in subsection (d) on an ongoing basis, as determined by the eligible agency. This may include consultation in order to—

"(1) provide input on annual updates to the comprehensive needs assessment required under subsection (c)(1)(B);

"(2) ensure programs of study are—

"(A) responsive to community employment needs;

"(B) aligned with employment priorities in the State, regional, tribal, or local economy identified by employers and the entities described in subsection (d), which may include in-demand industry sectors or occupations identified by the local workforce development board;

"(C) informed by labor market information, including information provided under section 15(e)(2)(C) of the Wagner-Peyser Act (29 U.S.C. 491–2(e)(2)(C));

"(D) designed to meet current, intermediate, or long-term labor market projections; and

"(E) allow employer input, including input from industry or sector partnerships in the local area, where applicable, into the development and implementation of programs of study to ensure such programs of study align with skills required by local employment opportunities,

including activities such as the identification of relevant standards, curriculum, industry-recognized credentials, and current technology and equipment;

"(3) identify and encourage opportunities for work-based learning; and

"(4) ensure funding under this part is used in a coordinated manner with other local resources.".

SEC. 134. LOCAL USES OF FUNDS.

Section 135 (20 U.S.C. 2355) is amended to read as follows:

"SEC. 135. LOCAL USES OF FUNDS.

"(a) GENERAL AUTHORITY.—Each eligible recipient that receives funds under this part shall use such funds to develop, coordinate, implement, or improve career and technical education programs to meet the needs identified in the comprehensive needs assessment described in section 134(c).

"(b) REQUIREMENTS FOR USES OF FUNDS.—Funds made available to eligible recipients under this part shall be used to support career and technical education programs that are of sufficient size, scope, and quality to be effective and that—

"(1) provide career exploration and career development activities through an organized, systematic framework designed to aid students, including in the middle grades, before enrolling and while participating in a career and technical education program, in making informed plans and decisions about future education and career opportunities and programs of study, which may include—

"(A) introductory courses or activities focused on career exploration and career awareness, including non-traditional fields;

"(B) readily available career and labor market information, including information on—

"(i) occupational supply and demand;

"(ii) educational requirements;

"(iii) other information on careers aligned to State, local, or Tribal (as applicable) economic priorities; and

"(iv) employment sectors;

"(C) programs and activities related to the development of student graduation and career plans;

"(D) career guidance and academic counselors that provide information on postsecondary education and career options;

"(E) any other activity that advances knowledge of career opportunities and assists students in making informed decisions about future education and employment goals, including non-traditional fields; or

"(F) providing students with strong experience in, and comprehensive understanding of, all aspects of an industry;

"(2) provide professional development for teachers, faculty, school leaders, administrators, specialized instructional support personnel, career guidance and academic counselors, or paraprofessionals, which may include—

"(A) professional development on supporting individualized academic and career and technical education instructional approaches, including the integration of academic and career and technical education standards and curricula;

"(B) professional development on ensuring labor market information is used to inform the programs, guidance, and advisement offered to students, including information provided under section 15(e)(2)(C) of the Wagner-Peyser Act (29 U.S.C. 49l–2(e)(2)(C));

"(C) providing teachers, faculty, school leaders, administrators, specialized instructional support personnel, career guidance and academic counselors, or paraprofessionals, as appropriate, with opportunities to advance knowledge, skills, and understanding of all aspects of an industry, including the latest workplace equipment, technologies, standards, and credentials;

"(D) supporting school leaders and administrators in managing career and technical education programs in the schools, institutions, or local educational agencies of such school leaders or administrators;

"(E) supporting the implementation of strategies to improve student achievement and close gaps in student participation and performance in career and technical education programs;

"(F) providing teachers, faculty, specialized instructional support personnel, career guidance and academic counselors, principals, school leaders, or paraprofessionals, as appropriate, with opportunities to advance knowledge, skills, and understanding in pedagogical practices, including, to the extent the eligible recipient determines that such evidence is reasonably available, evidence-based pedagogical practices;

"(G) training teachers, faculty, school leaders, administrators, specialized instructional support personnel, career guidance and academic counselors, or paraprofessionals, as appropriate, to provide appropriate accommodations for individuals with disabilities, and students with disabilities who are provided accommodations under the Rehabilitation Act of 1973 (29 U.S.C. 701 et seq.) or the Individuals with Disabilities Education Act;

"(H) training teachers, faculty, specialized instructional support personnel, career guidance and academic counselors, and paraprofessionals in frameworks to effectively teach students, including a particular focus on students with disabilities and English learners, which may include universal design for learning, multi-tier systems of supports, and positive behavioral interventions and support; or

"(I) training for the effective use of community spaces that provide access to tools, technology, and knowledge for learners and entrepreneurs, such as makerspaces or libraries;

"(3) provide within career and technical education the skills necessary to pursue careers in high-skill, high-wage, or in-demand industry sectors or occupations;

"(4) support integration of academic skills into career and technical education programs and programs of study to support—

"(A) CTE participants at the secondary school level in meeting the challenging State academic standards adopted under section 1111(b)(1) of the Elementary and

Secondary Education Act of 1965 by the State in which the eligible recipient is located; and

"(B) CTE participants at the postsecondary level in achieving academic skills;

"(5) plan and carry out elements that support the implementation of career and technical education programs and programs of study and that result in increasing student achievement of the local levels of performance established under section 113, which may include—

"(A) a curriculum aligned with the requirements for a program of study;

"(B) sustainable relationships among education, business and industry, and other community stakeholders, including industry or sector partnerships in the local area, where applicable, that are designed to facilitate the process of continuously updating and aligning programs of study with skills that are in demand in the State, regional, or local economy, and in collaboration with business outreach staff in one-stop centers, as defined in section 3 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3102), and other appropriate organizations, including community-based and youth-serving organizations;

"(C) where appropriate, expanding opportunities for CTE concentrators to participate in accelerated learning programs (as described in section 4104(b)(3)(A)(i)(IV) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7114(b)(3)(A)(i)(IV)), including dual or concurrent enrollment programs, early college high schools, and the development or implementation of articulation agreements as part of a career and technical education program of study;

"(D) appropriate equipment, technology, and instructional materials (including support for library resources) aligned with business and industry needs, including machinery, testing equipment, tools, implements, hardware and software, and other new and emerging instructional materials;

"(E) a continuum of work-based learning opportunities, including simulated work environments;

"(F) industry-recognized certification examinations or other assessments leading toward a recognized postsecondary credential;

"(G) efforts to recruit and retain career and technical education program teachers, faculty, school leaders, administrators, specialized instructional support personnel, career guidance and academic counselors, and paraprofessionals;

"(H) where applicable, coordination with other education and workforce development programs and initiatives, including career pathways and sector partnerships developed under the Workforce Innovation and Opportunity Act (29 U.S.C. 3101 et seq.) and other Federal laws and initiatives that provide students with transition-related services, including the Individuals with Disabilities Education Act;

"(I) expanding opportunities for students to participate in distance career and technical education and blended-learning programs;

"(J) expanding opportunities for students to participate in competency-based education programs;

"(K) improving career guidance and academic counseling programs that assist students in making informed academic and career and technical education decisions, including academic and financial aid counseling;

"(L) supporting the integration of employability skills into career and technical education programs and programs of study, including through family and consumer science programs;

"(M) supporting programs and activities that increase access, student engagement, and success in science, technology, engineering, and mathematics fields (including computer science and architecture) for students who are members of groups underrepresented in such subject fields;

"(N) providing career and technical education, in a school or other educational setting, for adults or out-of-school youth to complete secondary school education or upgrade technical skills;

"(O) supporting career and technical student organizations, including student preparation for and participation in technical skills competitions aligned with career and technical education program standards and curricula;

"(P) making all forms of instructional content widely available, which may include use of open educational resources;

"(Q) supporting the integration of arts and design skills, when appropriate, into career and technical education programs and programs of study;

"(R) partnering with a qualified intermediary to improve training, the development of public-private partnerships, systems development, capacity-building, and scalability of the delivery of high-quality career and technical education;

"(S) support to reduce or eliminate out-of-pocket expenses for special populations participating in career and technical education, including those participating in dual or concurrent enrollment programs or early college high school programs, and supporting the costs associated with fees, transportation, child care, or mobility challenges for those special populations; or

"(T) other activities to improve career and technical education programs; and

"(6) develop and implement evaluations of the activities carried out with funds under this part, including evaluations necessary to complete the comprehensive needs assessment required under section 134(c) and the local report required under section 113(b)(4)(B).

"(c) POOLING FUNDS.—An eligible recipient may pool a portion of funds received under this Act with a portion of funds received under this Act available to one or more eligible recipients to support implementation of programs of study through the activities described in subsection (b)(2).

"(d) ADMINISTRATIVE COSTS.—Each eligible recipient receiving funds under this part shall not use more than 5 percent of such funds for costs associated with the administration of activities under this section.".

TITLE II—GENERAL PROVISIONS

SEC. 201. FEDERAL AND STATE ADMINISTRATIVE PROVISIONS.

(a) IN GENERAL.—The Act (20 U.S.C. 2301 et seq.) is amended—

(1) in section 311—

(A) in subsection (a), by striking "and tech prep program activities"; and

(B) in subsection (b)—

(i) in paragraph (1)—

(I) by amending subparagraph (A) to read as follows:

"(A) IN GENERAL.—Except as provided in subparagraph (B), (C), or (D), in order for a State to receive its full allotment of funds under this Act for any fiscal year, the Secretary must find that the State's fiscal effort per student, or the aggregate expenditures of such State, with respect to career and technical education for the preceding fiscal year was not less than the fiscal effort per student, or the aggregate expenditures of such State, for the second preceding fiscal year.";

(II) in subparagraph (B), by striking "shall exclude capital expenditures, special 1-time project costs, and the cost of pilot programs." and inserting "shall, at the request of the State, exclude competitive or incentive-based programs established by the State, capital expenditures, special one-time project costs, and the cost of pilot programs."; and

(III) by adding at the end the following:

"(D) ESTABLISHING THE STATE BASELINE.—For purposes of applying subparagraph (A) for years which require the calculation of the State's fiscal effort per student, or aggregate expenditures of such State, with respect to career and technical education for the first full fiscal year following the date of enactment of the Strengthening Career and Technical Education for the 21st Century Act, the State may determine the State's fiscal effort per student, or aggregate expenditures of such State, with respect to career and technical education for such first full fiscal year by—

"(i) continuing to use the State's fiscal effort per student, or aggregate expenditures of such State, with respect to career and technical education, as was in effect on the day before the date of enactment of the Strengthening Career and Technical Education for the 21st Century Act; or

"(ii) establishing a new level of fiscal effort per student, or aggregate expenditures of such State, with respect to career and technical education, which is not less than 95 percent of the State's fiscal effort per student, or the aggregate expenditures of such State, with respect to career and technical education for the preceding fiscal year.";

(ii) by striking paragraph (2) and inserting the following:

"(2) FAILURE TO MEET.—

"(A) IN GENERAL.—The Secretary shall reduce the amount of a State's allotment of funds under this Act for any fiscal year in the exact proportion by which the State fails to meet the requirement of paragraph (1) by falling below the State's fiscal effort per student or the State's aggregate expenditures (using the measure most favorable to the State), if the State failed to meet such requirement (as determined using the measure most favorable to the State) for 1 or more of the 5 immediately preceding fiscal years.

"(B) SPECIAL RULE.—No such lesser amount shall be used for computing the effort required under paragraph (1) for subsequent years.

"(3) WAIVER.—The Secretary may waive paragraph (2) due to exceptional or uncontrollable circumstances affecting the ability of the State to meet the requirement of paragraph (1) such as a natural disaster or an unforeseen and precipitous decline in financial resources. No level of funding permitted under such a waiver may be used as the basis for computing the fiscal effort or aggregate expenditures required under this section for years subsequent to the year covered by such waiver. The fiscal effort or aggregate expenditures for the subsequent years shall be computed on the basis of the level of funding that would, but for such waiver, have been required.";

(2) in section 314(1), by striking "career path or major" and inserting "career pathway or program of study";

(3) in section 315—

(A) by inserting "or programs of study" after "career and technical education programs"; and

(B) by striking "seventh grade" and inserting "the middle grades (as such term is defined in section 8101 of the Elementary and Secondary Education Act of 1965)";

(4) in section 317(b)—

(A) in paragraph (1)—

(i) by inserting ", including programs of study," after "activities"; and

(ii) by striking "who reside in the geographical area served by" and inserting "in areas served by"; and

(B) in paragraph (2)—

(i) by striking "the geographical area" and inserting "areas"; and

(ii) by inserting ", including programs of study," after "activities";

(5) by striking title II and redesignating title III as title II;

(6) by redesignating sections 311 through 318, as amended by this section, as sections 211 through 218, respectively;

(7) by redesignating sections 321 through 324 as sections 221 through 224, respectively; and

(8) by inserting after section 218 (as so redesignated) the following:

"SEC. 219. STUDY ON PROGRAMS OF STUDY ALIGNED TO HIGH-SKILL, HIGH-WAGE OCCUPATIONS.

"(a) SCOPE OF STUDY.—The Comptroller General of the United States shall conduct a study to evaluate—

"(1) the strategies, components, policies, and practices used by eligible agencies or eligible recipients receiving funding under this Act to successfully assist—

"(A) all students in pursuing and completing programs of study aligned to high-skill, high-wage occupations; and

"(B) any special population or specific subgroup of students identified in section 1111(h)(1)(C)(ii) of the Elementary and Secondary Education Act of 1965 in pursuing and completing programs of study aligned to high-skill, high-wage occupations in fields in which such special population or subgroup is underrepresented; and

"(2) any challenges associated with replication of such strategies, components, policies, and practices.

"(b) CONSULTATION.—In carrying out the study conducted under subsection (a), the Comptroller General of the United States shall consult with a geographically diverse (including urban, suburban, and rural) representation of—

"(1) students and parents;

"(2) eligible agencies and eligible recipients;

"(3) teachers, faculty, specialized instructional support personnel, and paraprofessionals, including those with expertise in preparing career and technical education students for nontraditional fields;

"(4) Indian Tribes and Tribal organizations;

"(5) special populations; and

"(6) representatives of business and industry.

"(c) SUBMISSION.—Upon completion, the Comptroller General of the United States shall submit the study conducted under subsection (a) to the Committee on Education and the Workforce of the House of Representatives and the Committee on Health, Education, Labor, and Pensions of the Senate.".

(b) CONFORMING AMENDMENT.—Section 8(a) (20 U.S.C. 2306a(a)) is amended by striking "311(b), and 323" and inserting "211(b), and 223".

TITLE III—AMENDMENTS TO OTHER LAWS

SEC. 301. AMENDMENTS TO THE WAGNER-PEYSER ACT.

Section 15(e)(2) of the Wagner-Peyser Act (29 U.S.C. 49l–2(e)(2)) is amended—

(1) by striking subparagraph (B) and inserting the following:

"(B) consult with eligible agencies (defined in section 3 of the Carl D. Perkins Career and Technical Education Act of 2006 (20 U.S.C. 2302)), State educational agencies, and local educational agencies concerning the provision of workforce and labor market information in order to—

"(i) meet the needs of secondary school and postsecondary school students who seek such information; and

"(ii) annually inform the development and implementation of programs of study defined in section 3 of the Carl D. Perkins Career and Technical Education Act of 2006 (20 U.S.C. 2302), and career pathways;";

(2) in subparagraph (G), by striking "and" after the semicolon;

(3) in subparagraph (H), by striking the period at the end and inserting "; and"; and

(4) by adding at the end the following:

"(I) provide, on an annual and timely basis to each eligible agency (defined in section 3 of the Carl D. Perkins Career and Technical Education Act of 2006 (20 U.S.C. 2302)), the data and information described in subparagraphs (A) and (B) of subsection (a)(1).".

SEC. 302. AMENDMENTS TO THE ELEMENTARY AND SECONDARY EDUCATION ACT OF 1965.

(1) Section 1111(h)(1)(C)(xiv) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 6311(h)(1)(C)(xiv)) is amended by striking "attaining career and technical proficiencies (as defined by section 113(b) of the Carl D. Perkins Career and Technical Education Act of 2006 (20 U.S.C. 2323(b)) and reported by States only in a manner consistent with section 113(c) of such Act (20 U.S.C. 2323(c))" and inserting "meeting State determined levels of performance for core indicators, as defined by section 113(b)(3)(A) of the Carl D. Perkins Career and Technical Education Act of 2006 (20 U.S.C. 2323(b)(3)(A)), and reported by States only in a manner consistent with section 113(b)(3)(C) of such Act (20 U.S.C. 2323(b)(3)(C))".

(2) Section 6115(b)(6) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7425(b)(6)) is amended by striking "tech-prep education, mentoring," and inserting "mentoring".

(3) Section 6304(a)(3)(K) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7544(a)(3)(K)) is amended by striking "tech-prep,".

SEC. 303. AMENDMENT TO THE WORKFORCE INNOVATION AND OPPORTUNITY ACT.

Section 134(c)(2)(A)(vii) of the Workforce Innovation and Opportunity Act (29 U.S.C. 3174(c)(2)(A)(vii)) is amended by striking "school dropouts" and inserting "out-of-school youth".

Speaker of the House of Representatives.

Vice President of the United States and
President of the Senate.