

**1. STATEMENT OF NEED.** Front Range Community College (FRCC) (fiscal lead) and its robust consortium to include seven community colleges, a technical college, a 4-year university and 27 manufacturers throughout the state propose the Colorado Helps Advanced Manufacturing Program (CHAMP). CHAMP is an ambitious project that will increase the attainment of manufacturing degrees and certificates that align with the industry's recognized competencies, skills and certifications to create a pipeline of highly-qualified advanced manufacturing industry workers. Advanced manufacturing is a type of manufacturing that makes extensive use of computer, high precision and information technologies, coupled with a high performance workforce capable of producing small or large volumes with the efficiency of mass production and the flexibility of custom manufacturing in order to respond rapidly to customer demands (The National Council for Advanced Manufacturing). CHAMP's goals are: 1) to build off Colorado's existing and emerging manufacturing sector partnerships and career pathway work to develop employer-driven curriculum throughout the grant period; 2) use technology to accelerate training and reach a broad audience; 3) redesign the current Colorado Community College System model for credit for prior learning to accelerate certification; and 4) develop stackable and latticed certificates with institutional agreements between the participating community colleges and Metropolitan State University at Denver (MSU Denver). FRCC's seven partnering community colleges are: Aims Community College (AIMS), the Community College of Denver (CCD), Emily Griffith Technical College (EGTC), Lamar Community College (LCC), Pikes Peak Community College (PPCC), Pueblo Community College (PCC) and Red Rocks Community College/Warren Technical College (RRCC). MSU Denver is CHAMP's four-year partner and will be accepting credit acquired from partnering community colleges for transfer and articulation to MSU Denver's degree programs. The largest manufacturing industry association, the Colorado Advanced Manufacturing Alliance (CAMA), will assist with

convening employers and will participate in statewide quarterly meetings to share the industry's perspective. These government entities are also part of the CHAMP consortium: the Colorado Office of Economic Development and International Trade, the Colorado Department of Labor and Employment, and the Colorado Workforce Development Council.

Manufacturing is critically important to the United States because it provides high-wage jobs, supports innovation and reduces the trade deficit. The U.S. manufacturing sector is so large that if it were its own country, it would rank as the 10th largest world economy.<sup>1</sup> Manufacturing supports an estimated 17.5 million jobs in the United States and 120,000 in Colorado.<sup>2</sup> Colorado is nationally known for its success in manufacturing sector partnerships, for the intentional integration of career pathways and sector partnerships, and for the recent successful outcomes of its National Governors Association Policy Academy on advanced manufacturing.<sup>3</sup>

Manufacturing is becoming more sophisticated, however, there is a shortfall in the quality and number of workers who can succeed in the new face of manufacturing due to a lack of foundational knowledge, specialized skills, portable production skills, as well as flexibility and adaptability in work habits. A survey of manufacturers by the Manufacturing Institute and Deloitte on available skills to support manufacturing growth revealed that 82% of manufacturers reported moderate-to-serious gaps in the availability of skilled manufacturing candidates.<sup>4</sup> Fifty-six percent anticipated the shortage to grow worse in the next three to five years.<sup>5</sup> Additionally, 74% of manufacturers reported that this skills gap has negatively impacted their company's ability to expand operations. This skills gap has resulted in 5% of all manufacturing jobs going

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<sup>1</sup> Manufacturing Institute. (2012). *Facts about manufacturing*. Manufacturing Institute, MAPI and the National Association of Manufacturers.

<sup>2</sup> Ibid.

<sup>3</sup> NGA. (2013). Retrieved from <http://www.nga.org/files/live/sites/NGA/files/pdf/2013/1301NGASSSReport.pdf>.

<sup>4</sup> Deloitte and the Manufacturing Institute. "Boiling Point? The Skills Gap in U.S. Manufacturing." Retrieved from [www.themanufacturinginstitute.org/~media/A07730B2A798437D98501E798C2E13AA.ashx](http://www.themanufacturinginstitute.org/~media/A07730B2A798437D98501E798C2E13AA.ashx).

<sup>5</sup> Deloitte and the Manufacturing Institute. "Unwavering Commitment: The Public's View of the Manufacturing Industry Today," 2011 Annual Index. Retrieved from [www.themanufacturinginstitute.org/~media/2AB778520C734D888156A90B667C1E70.ashx](http://www.themanufacturinginstitute.org/~media/2AB778520C734D888156A90B667C1E70.ashx).

unfilled, even in the face of high unemployment levels.<sup>6</sup> CHAMP will address these gaps.

**I. SERVING THE NEEDS OF TAA-ELIGIBLE WORKERS. 1.a. Impact of foreign trade.** The last

decade saw severe manufacturing job losses in the U.S. as companies moved jobs overseas—

total employment in the industry fell from 13% to 9% in 2009 alone.<sup>7</sup> Since 2008, 5,445 TAA-

eligible participants in Colorado lost manufacturing jobs. The table below documents a *sample* of

TAA certification determinations in the CHAMP-targeted areas since 2008.

<b>TAW number</b>	<b>Company</b>	<b>City</b>	<b>Decision Date</b>	<b># Affected</b>
64114	Advanced Energy Industries, Inc.	Fort Collins	10/28/2008	227
64611	Optima Batteries, Inc.	Aurora	12/23/2008	216
73854	MSA	Englewood	5/26/2010	141
71131	Reliant Manufacturing Service LLC	Longmont	7/28/2009	173
64942	Bestop, Inc.	Broomfield	2/10/2009	178
74013	WellPoint, Inc.	Denver	6/15/2010	77
73987	Ford Motor Credit Company, LLC	Colorado Springs	6/29/2010	78
71482	Trane	Pueblo	1/22/2010	196
71786	Eastman Kodak Company, Graphic Communications Group	Windsor	9/2/2009	339
74850	StarTek USA, Inc.	Greeley	12/28/2010	145

**How the project will serve TAA-eligible workers.** CHAMP’s consortium institutions will prioritize TAA-eligible workers across Colorado and also market the program to other adults, particularly women and veterans. CHAMP includes innovative, online learning systems, which will provide workers with the knowledge expected by manufacturers. Students will also benefit from the development of manufacturing career pathways with well-defined and employer-driven courses and certifications. CHAMP will improve the consortium institutions’ ability to deliver online education by working with a program lead instructional design coordinator and a program online curriculum developer who will help the CHAMP colleges’ online instructional staff make new and existing courses available for online and hybrid delivery.

<sup>6</sup> Ibid.

<sup>7</sup> Bureau of Labor Statistics Current Employment Statistics data.

**Partnerships with TAA agencies.** Colorado Workforce Development Council (CWDC), a partnership between Colorado Department of Labor and Employment (CDLE), The Colorado Department of Higher Education (CDHE), and the Office of Economic Development and International Trade (OEDIT), has been involved in the planning of CHAMP and will remain involved on the advisory committee. Additionally, each consortium college will meet monthly during the first year of the grant period, and quarterly thereafter with its area workforce center to build awareness of the program with the TAA specialists and ensure that the program is on the eligible provider list for the state so workforce center clients can receive funding to attend training offered through CHAMP. In total, CHAMP will leverage partnerships with 10 public workforce centers to enroll TAA-eligible workers into one of the consortium institution's degree or certificate programs aimed at returning adults to the workforce as quickly as possible in a high-wage, high-demand advanced manufacturing job.

**Education/Training needs and barriers of TAA-eligible workers.** CHAMP will target TAA-eligible workers who were employed in a variety of industries including: timber/logging, mining, transportation and telecommunications. Most of the occupations targeted by CHAMP will not require undergraduate degrees, but will require industry-recognized certifications. A 2012 survey of 33 diverse manufacturers in Denver and Pueblo found that most employers found it "very difficult" to hire skilled workers and 72% of surveyed companies said that they would increase sales/production if they could find competent employees. For example, Faustson Tools, one of the partnering manufacturers in CHAMP's consortium, has machines that sit idle when they are needed in production because the company cannot find skilled workers to operate them.

CHAMP will address TAA workers' barriers to enrollment and retention. TAA workers must be retrained quickly before their financial assistance is exhausted. Thus, career choices are often made based upon time and prerequisite requirements rather than future job growth and

compatibility with the worker's skills and interests. Many workers are also unfamiliar with how to conduct a job search or navigate employment and education systems. Recognizing that many TAA workers are in need of additional support, college/workforce navigators with consultation from area employers and workforce centers will work with students in selecting the appropriate manufacturing program, based on interest and aptitude, and provide retention and placement services, including internships, in conjunction with the workforce centers. TAA workers must also balance multiple priorities associated with their job search, training and family responsibilities. Transportation barriers are also endemic among the consortium's rural service area, further restricting TAA-eligible workers' ability to continue their education or training. Therefore, CHAMP will increase the availability of online/hybrid courses.

## **II. EVIDENCE OF JOB OPPORTUNITIES IN THE TARGETED INDUSTRIES AND OCCUPATIONS. 1.**

**Targeted industries/Occupations.** As the consortium designed CHAMP, employer partners shared their most pressing hiring needs. Based on this information, the consortium selected occupations within the manufacturing industry that are expected to have high job growth. In Colorado, the most common job openings are for production workers, quality/inspection workers, assembly technicians, electronics technicians, electrical and mechanical maintenance technicians, and engineering technicians. The NAICS Industry sector codes for manufacturing that CHAMP is targeting are: 331/332 (metal); 311/312 (food & beverage); 322/323 (paper & printing); 326 (plastics & rubber); 325 (chemical); 324/327 (petroleum, coal & mining); 321/337 (wood & furniture); 336 (transportation equipment); 334/335 (computers & electronics); and 339 (miscellaneous). Despite recent job retraction in the manufacturing industry, the last two years have brought positive signs for manufacturing as more companies are bringing jobs back to the U.S. The number of manufacturing jobs increased by 3% from December 2009 through September 2011, and these gains were concentrated in durable goods manufacturing, which is

generally the higher-wage, more productive part of manufacturing.<sup>8</sup>

Employers are integral members of this consortium. Colorado has adopted an employer driven model as the way of doing business. The Colorado Sector Partnership initiative through the states's Workforce Investment Board and CWDC invested \$3.7 million in public dollars to fund 11 pilot partnerships that included over 100 employers and led to 1,100 workers upgrading their job skills. These eight regional manufacturing sector partnerships laid the foundation for industry engagement for the CHAMP proposal. A poignant lesson learned by the DOL High Growth Job Training Initiative grantees was that, unless employers believed the training programs would meet their needs, they were reluctant to participate in substantive ways.<sup>9</sup> Therefore, to be included in the CHAMP consortium, institutions were required to prove they had well-established relationships with industry partners.

All consortium institutions are in regions that have identified manufacturing sector partnerships as emerging or expanding sector partnerships and are actively working to develop these partnerships to include employers on their advisory committees to contribute to the development of the curricula to ensure that it will teach students the skills that employers need. Employers will also be instrumental in hiring students as they complete their degree or certificate programs. The following employers have committed to hiring graduates of the consortium institution's programs: Accu-Precision Tool and Gauge, LLC.; Alfred Manufacturing ; Barber-Nichols, Inc.; EVRAZ; GeoTech Environmental Equipment Inc.; Ingram Machining, Inc. Mountainside Medical Colorado, LLC; Intrex Aerospace; JPM Prototype & Mfg. Co.; Manes Machine and Engineering Company; Mountainside Medical Colorado, LLC; Quantum; Stacy Machine and Tooling, Inc.; St. Vrain Manufacturing; Techniques Swiss, LLC; Trane; Whip Mix Corporation; and Woodward.

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<sup>8</sup> Bureau of Labor Statistics Current Employment Statistics data.

<sup>9</sup> Eyster, L., Smith Nightingale, D., Barnow, B., O'Brien, C., Trutko, J., & Kuehn, D. (2010). Implementation and early training outcomes of high growth job training initiative: Final report. Urban Institute.

**Evidence of employer demand.** Colorado is an ideal location for CHAMP. Colorado's manufacturing industry is diverse and geographically disbursed across the state, with over 5,900 manufacturing companies and more than 120,000 employees. Between 2006 and 2011, Colorado's manufacturing production increased by 29%, which is higher than the U.S. average of 11%.<sup>10</sup> Colorado companies engage in a full-spectrum of advanced manufacturing activities.

Colorado's manufacturing industry employs a workforce across four main segments: *computer and electronic manufacturing* segments (semiconductor machinery manufacturing, and electrical equipment and component manufacturing, and final product manufacturing, such as solar panels); the *food and beverage manufacturing* segment (animal slaughtering and processing, breweries and soft drink manufacturing, bread and baked goods manufacturing, dairy product manufacturing); *fabricated metal product manufacturing* (precision machine shops and structural material production; machinery manufacturing, which includes wind turbines, agricultural implements, mining equipment, optical systems and HVAC systems; and *miscellaneous manufacturing* (medical devices and outdoor recreation equipment). In addition, the computer and electronics manufacturing sector is by far the state's largest exporter in terms of value of goods sold to foreign countries; it represents close to 30% of all Colorado's goods exported with a value of nearly \$2 billion in 2011.

While employment within Colorado's manufacturing industry is growing, its skilled workforce is shrinking and a 2013 survey by CAMA found that manufacturers had to recruit out of state for tool and die makers, maintenance technicians, machinists, CNC machine operators, quality/inspection and engineers. The manufacturing sector appears to be disproportionately experiencing the ramifications of an aging workforce. In 2000, the median age of a manufacturing worker was 41, but by 2011, it had increased to 44.<sup>11</sup>

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<sup>10</sup> Ibid at 1.

<sup>11</sup> Ibid at 1.

In addition to employee losses due to retirement, the manufacturing industry is requiring a more educated workforce. Because of the use of increasingly sophisticated equipment and the new methods of production that require more process- and team-oriented workers, the share of manufacturing workers with a bachelor's degree has increased from 16% in 2000 to 20% in 2011. Simultaneously, the percentage of manufacturing workers with only a high school degree declined from 14% in 2000 to 11% in 2011. Most jobs forecasters believe that the number of employers who will hire lower-educated and lower-skilled workers will continue to decline.<sup>12</sup> Therefore, CHAMP's two-year colleges will work to streamline the credit transfer process to MSU Denver, CHAMP's four-year university partner.

Manufacturing employees earn high wages, relative to other industries. Research indicates that the main reason why manufacturing wages and benefits are higher than those outside of manufacturing is that manufacturers need to pay higher wages to ensure that their workers are appropriately skilled and motivated.<sup>13</sup> Two dimensions of skill and motivation especially matter for manufacturers. First, manufacturers face higher costs of downtime, in part because they are more capital-intensive than other businesses.<sup>14</sup> To obtain qualified, motivated workers who will work to avoid this downtime, employers pay higher wages. Second, factories on average are larger than most other business establishments. This makes it more difficult and costly for factory managers to control the work process. To induce workers to take responsibility for their work, manufacturers pay higher wages.<sup>15</sup> The average annual wage for Colorado employees working in the manufacturing industry is \$73,700.<sup>16</sup> Occupations in manufacturing are also more

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<sup>12</sup> Ibid at 1.

<sup>13</sup> Woodcock, S. (2008). Wage differentials in the presence of unobserved worker, firm, and match heterogeneity. *Labour Economics* 15, 774-98.

<sup>14</sup> Analysis of Bureau of Economic Analysis industry accounts data, capital (measured as gross operating surplus plus taxes on production and imports less subsidies) per worker was 21 percent higher in manufacturing than in the economy as a whole in 2009.

<sup>15</sup> Gittleman, M., & Pierce, B. (2011). Inter-industry wage differentials, job content, and unobserved ability. *Industrial and Labor Relations Review* 64, 356-72.

<sup>16</sup> EMSI, second quarter 2012.

likely to provide employee benefits.<sup>17</sup>

The following table includes Colorado LMI data and each consortium area's respective department of labor data to depict the current and anticipated job openings in a *sample* of manufacturing occupations that will be targeted by the institutions participating in CHAMP.

<b>Job Title</b>	<b>Employer</b>	<b>Geographic Region</b>	<b>Short-term Demand (2012-2014)</b>	<b>% Increase</b>
Industrial engineering technicians	Miller-Coors	Front Range	25	2.1%
Engineering technicians	JPM Prototype & Mfg. Co Woodward	South Central Front Range	53	1.9%
Electrical and Electronic Equipment Assemblers	Atlas Pacific Leprino Foods Quantum Trane Vestas	South North South-central South	159	2.0%
Structural Metal Fabricators and Fitters	Alfred Manufacturing	Denver-metro	74	3.8%
Computer-Controlled Machine Tool Operators, Metal and Plastic	Accu-Precision Tool & Gauge, LLC. Ingram Machining, Inc. Techniques Swiss	Front Range	83	3.5%
Computer Numerically Controlled (CNC) Machine Tool Programmers	Barber-Nichols, Inc. Stacy Machine and Tooling	Front Range	11	3.1%
Rolling Machine Setters, Operators, and Tenders, Metal and Plastics	Krage Mfg. Leprino Foods	South North	16	3.3%
Cutting, Punching, and Press Machine Setters, Operators, and	GeoTech GCC Rio Grande	Denver-metro South	56	2.4%
Welders, Cutters, Solderers, and Brazers	Airgas SEMCO Vestas	Southeastern Colorado	252	3.2%
Machinists	Evraz GeoTech Metalcraft Industries Mountainside Medical Whip Mix Corp.	South Denver-metro Front Range Larimer Front Range	166	1.8%

<sup>17</sup> Helper, S., Krueger, T., & Wial, H. (2012). Why does manufacturing matter? Which manufacturing matters? A policy framework. *Metropolitan Policy Program at Brookings*.

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**Required knowledge, skills, abilities and credentials.** Deloitte, in its 2012 presentation “Talent Driven Innovation: The Key To Competitiveness” stated that there were 600,000 manufacturing job in the U.S. that were unfilled because employers could not find people with the necessary skills. These skills shortages pervade at all stages of manufacturing—from engineering to skilled production, but the most common unfilled jobs included skilled production, design engineers, engineering technologists and machinists—all of which are occupations targeted by CHAMP. Today’s innovation-based manufacturing requires a technical workforce with better applied science and math skills, team building, and problem solving, as well as a holistic knowledge of manufacturing principles that enables them to adapt to new production processes.<sup>18</sup>

Employers require an array of technical skills necessary for a variety of manufacturing occupations including shop math, basic CAD, basic print or schematic reading, understanding of inspection and quality principles, job safety and the ability to set up and operate manual or production machines. In addition, each occupation has its own technical skills that employees must master. Manufacturing employers have also told the consortium that many job candidates are excluded from consideration because they do not possess basic employability skills such as leadership, effective verbal/written communication, professionalism, project management, dependability, initiative, teamwork, and problem solving skills.

The manufacturing industry is also experiencing a growing demand for workers with specific credentials and/or certifications. CHAMP’s colleges will train students for positions in the following occupations: machining, welding, engineering graphics/CAD, mechatronics/electro-mechanical technicians, manufacturing building trade and supervisory positions within

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<sup>18</sup> The National Association of Manufacturers Institute.

manufacturing. Each of these occupation-related credentials, many of which can be stacked and latticed, will be included in the consortium institution's programs.

**Employers' feedback on any content developed/delivered during the life of the project.**

Through the sector partnerships and CHAMP employers, manufacturers will provide input throughout the development and delivery of CHAMP.

**Participation in sectoral strategy.** CHAMP's consortium partners are involved in several of the sectoral strategies that bring together the manufacturing employers within their region. Colorado boasts eight regional manufacturing sector partnerships. For example, PCC is involved in the Pueblo Manufacturing Sectoral Collaboration (PMSC), which includes 25 manufacturers, and governmental and educational institutions to increase the technical and professional skills of the region's manufacturing workforce. FRCC is involved in the Sustainable Manufacturing Industry Alliance of Colorado (SMIAC) sectoral partnership, which targets Adams and Weld counties employers' needs in sustainable manufacturing. SMIAC and PMSC sectoral partnerships include workforce centers, secondary and postsecondary institutions, training providers and businesses. CCD, EGTC and RRCC are collaborators in the Denver Metro Area Sector Partnership, and LCC is a partner in the Southeastern Colorado regional sector manufacturing partnership. Colorado is dedicated to continuing sector partnerships. The 2013 Sectors Summit brought regional teams of partners from economic development, workforce, education and business together to identify industries critical to their regional economies based on a combination of data and first hand knowledge about the community and business. As a result eight regions are actively focusing on developing or expanding manufacturing sector partnerships. All CHAMP institutions have at least an emerging or expanding sector partnership.

**iii. Gap Analyses. Gaps in existing training programs/systems infrastructure.** The Colorado Advanced Manufacturing Alliance (CAMA) identified two obstacles impeding the ability of

training programs to meet the needs of industry: 1) the lack of a consistent industry voice about needs, and 2) the absence of a strong network to facilitate business-to-business activity and partnering with educational institutions. Like other states, Colorado has industry networks, but the current governor has prioritized unifying the work by identifying a “backbone organization” to deliberately drive regular convenings and keep the industry voice at the forefront while improving or creating policies and programs. In the case of advanced manufacturing, a credible convener did not exist, so CAMA was created and is an integral partner in CHAMP.

CHAMP and CAMA will address the industry gaps that are uncovered by CAMA by redesigning the participating colleges’ manufacturing programs so the skill set that students learn is fully aligned with the skills needed by industry and reflect the nationally-recognized certifications that are valuable to employers. CHAMP will address the lack of training programs in critical areas in which job growth in manufacturing is anticipated. For example, while most of the consortium’s community colleges offer business administration and management programs, only one offers a program in heavy equipment, industrial electronics technology, manufacturing technology, precision machining and process technology, all areas in which growth is expected.

**Analysis of gaps in ability to serve TAA-eligible adults. *Limitations in the number of students served compared to demonstrated demand.*** This grant will enable CHAMP’s consortium colleges to attract more students to their manufacturing programs by making their curricula more responsive to the current job market and incorporating the specialized equipment recommended by industry partners. This lack of available equipment at the consortium’s colleges not only affects the numbers served, but also the amount of time students can spend becoming competent with each machine, which impacts the quality of student learning. For example, AIMS’ CAD program currently has limited capacity to teach 3D printing because there are not enough machines. AIMS anticipates that this grant will increase the number of students it is able

to competently train by 36% over the course of the grant period. In addition, facility space limits the number of machines that can fit in the classroom, so several of the colleges will lease space to accommodate the new equipment. For example, CCD will double the size of its machining and welding facilities and will house its engineering graphics programs in the same space, which will allow students to gain more depth about manufacturing by experiencing all phases of manufacturing, from design through production. The expanded facilities will also give CCD the capacity to serve 80% more students in these existing and newly developed program areas.

***Limitations in faculty expertise and facility infrastructure.*** A limitation of trade programs, which is common among college faculty, is that instructors are often recruited from industry after they retire. This results in a lack of up-to-date knowledge about how industry has advanced, which results in a lack of up-to-date knowledge about how industry has advanced, as well as a lack of familiarity with teaching in a college setting. For this reason, CHAMP has included extensive professional development for faculty, particularly in online instruction. Several colleges also need funding to help their faculty pursue or maintain industry certifications themselves. In addition, all of the consortium's colleges need additional full-time faculty in order to provide quality advising to students and simultaneously work with employers to remain up-to-date in their knowledge. To ensure that CHAMP is successful with employing hybrid and online courses, all consortium colleges will use common software and associated equipment. Several colleges also need electrical upgrades for their welding and machining programs, as well as isolated cement pads for heavy equipment.

***Limitations in the content/ quality of courses.*** All of CHAMP's participating manufacturers report that students do not graduate with the skills they need to be ready to work on day one. Due to the diversity of Colorado's manufacturers, not all technical needs for all employers are the same, however, by evaluating for cross-cutting skills that will meet a majority of the needs,

appropriate courses will be modified by adding content identified by employers. Therefore, all courses will be modified by adding content identified by employers that students need to become competent to be successful in their chosen occupation (e.g., 5-axis milling machines, an area in which several employers noted that students lack skills). In addition, to meet the needs of incumbent workers, courses will be offered in the evening and on weekends, and existing courses will be adapted for hybrid delivery to increase availability to all students.

***Attrition-related factors.*** In addition to factors that contribute to attrition common among community college students, such as inadequate transportation, lack of childcare and poor study habits, the consortium has identified factors specific to manufacturing students that will be addressed by CHAMP. Many students re-enter community college from the workforce and become discouraged when they are required to take courses to learn content and skills that they have already mastered. Therefore, CHAMP will overhaul its process of providing credit for prior learning, so that the time required to complete the program is compressed. In addition, many students will already be employed in manufacturing and working shifts, which rotate every few weeks. This radical change in students' work schedules severely impacts their ability to attend class throughout a semester. Therefore, CHAMP will develop online/hybrid courses so students can continue to take their classes even if they are working the third (overnight) shift. To proactively address students' unfamiliarity with online learning, navigators (trained counselors who support students and employers as they navigate the new training options) will be employed at each college to help students who are struggling. Finally, lack of math aptitude limits students pursuing higher-paid occupations that require advanced math competency. Therefore, CHAMP will leverage Colorado's previously funded, Round 1 TAACCT program that modularized and contextualized developmental math courses so students can more quickly gain needed math skills to enroll and successfully complete the required math in their targeted program. CHAMP will

also embed higher level math content into the existing contextualized math courses for manufacturing students so those individuals who wish to pursue an engineering degree at MSU will not need to take fundamental math courses, e.g., pre-calculus.

***Need for specialized equipment.*** To ensure that students who graduate are competent to run the equipment that is expected in a manufacturing setting, several pieces of equipment will be purchased, e.g., machining, manual and computer numerical controlled mills and lathes, other metal working machines, 5-axis milling machines and related software (training programs using this cutting-edge technology are very limited outside the East and West coasts), Swiss screw machines, 3D printers and scanners, virtual welding simulators, coordinate measurement machines, mechatronic (the combination of mechanical and electrical systems) modules and an advanced soldering station. Detail about this equipment is in the budget narrative.

**2. METHODOLOGY AND WORK PLAN.** CHAMP includes 10 major project components:

***1. Interactive career map:*** The Council for Adult and Experiential Learning (CAEL) will build an interactive career map for Colorado's manufacturing industry. This career map will link to the Employer Scorecard, and to Burning Glass, a source for real-time jobs data, geographic locations of Colorado's advanced manufacturing employer, and workforce development training.

***2. Portfolio assessment for Colorado's advanced manufacturing:*** Drawing upon its expertise and experience in assessing learning, CAEL will build portfolio assessments that incorporate tools and methods for documenting the knowledge, skills and abilities of an individual against the competencies required for target occupations and vetted by CHAMP's industry partners.

These assessments will serve not only to document competencies that individuals already possess from prior learning, but also to identify gaps to guide individuals' further learning. An example of a portfolio assessment for an individual seeking a job in the metalworking industry could include documentation of foundational academic skills assessed by tools similar to the ACT

WorkKeys assessment of applied reading and math, essential cross-industry technical skills as assessed and documented by broad industry supported certifications, video performance demonstrations of machining skills aligned with NIMS Standards for Machining Level 1 Certification, and essays written in response to prompts that demonstrate an individual's critical thinking and problem solving skills. Assessment of these products will be evaluated for college credit and portfolio assessments will result in a transcript that delineates clear crosswalks between industry requirements and recognized industry certifications, such as the MSSC CPT and credit-bearing college courses and credentials.

**3. Credit for prior learning redesign:** CAEL will develop a protocol for awarding credit for prior learning that all consortium institutions will use. More detail about this is described below.

**4. Employer-driven certifications and curricula content:** The consortium colleges are committed to revising their manufacturing-related courses to better meet employers' needs via sector partnerships. CHAMP includes quarterly meetings for employers in the first year and quarterly thereafter to direct those changes and inform the colleges which course content and credentials/certifications they find valuable.

**5. Online and hybrid course development:** The consortium colleges will develop blended courses (hybrid or mixed-mode courses) where a portion of the traditional face-to-face instruction is replaced by web-based online learning. This will permit class time to be used for lab activities, creating a richer, immersive learning environment. Technical and curriculum support to make those changes will be available through the CHAMP program online instructional team. The Center for Advanced Visualization and Experiential Analysis (CAVEA) at MSU Denver will be available to consortium colleges to review online courses with employers during quarterly convenings providing a way to refine curriculum.

**6. Massive open online courses (MOOCs):** The consortium colleges will develop three MOOCs:

a math for manufacturers/engineers course, a basic employability skills for manufacturers course, and a credit for prior learning MOOC for students, faculty, workforce centers and community service organizations to help with the credit for prior learning implementation. The new math MOOC will leverage the lessons learned during Colorado's Round 1 TAACCT grant for contextualized developmental education courses including math. CHAMP would add content, e.g., trigonometry to CCCS' existing Math 108 course, which is a technical math course, so that it would transfer to four-year institutions. The new course would be contextualized to manufacturing and would be modularized so that students could complete it more quickly. The basic employability for manufacturers MOOC would also include an openly licensed rubric that instructors can use to assess students' mastery of basic employability skills, e.g., professionalism, initiative and teamwork. All MOOCs will be openly licensed.

**7. Streamlined transfer and articulation to MSU:** CHAMP's four-year partner, MSU Denver, is committed to working with each participating community college to crosswalk their manufacturing programs with the university's engineering degree so students can easily understand which course will transfer toward a bachelor's degree at MSU Denver.

**8. Navigators:** Each college will hire a navigator who will develop and teach a student success course that includes online learning strategies, professionalism, teamwork, resume writing and interviewing skills and collaborate with other navigators and CHAMP's instructional design coordinator to contextualize the course for manufacturing students. The college navigators will also coach students on how to utilize credit for prior learning, how to be a successful student, how to apply for financial aid and scholarships, how to develop an academic and career plan, how to transfer or lattice a program with another institution. Navigators will also be available to orient students to the campus and its services.

**9. Internships:** An internship coordinator will be hired at each consortia member institution to

help employers define interns' roles and place manufacturing students in internships with participating employers. The internship coordinator will also coach students on how to become effective employees, how to find and maintain jobs, and advance up the career pathway.

**10. Professional development:** Because of the anticipated course modifications that will be driven by employers' feedback, the development of online and hybrid courses, credit for prior learning redesign, the new career map and portfolio assessment for advanced manufacturing, professional development for academic advisors, faculty and workforce center staff will be an integral and ongoing part of CHAMP.

**I. EVIDENCE-BASED DESIGN. 1. Evidence for program design.** The proposed **strategies for online and hybrid delivery** are based on strong research about adult learning, blended learning models and best practices in online career and technical education courses.<sup>19</sup> Research indicates that online and hybrid learning models have a strong affinity with adult learning theory, which stresses the need for autonomy, self-direction and relevant learning as key design elements.<sup>20</sup> A *strong* body of evidence on blended learning models supports CHAMP's approach, and is based on research from the University of Central Florida<sup>21</sup> and the U.S. Department of Education.<sup>22</sup>

There is also strong evidence to support CHAMP's **student coaching strategy** that the navigators will use. In a recent randomized experiment of mostly non-traditional students that took place over two years, researchers found that the students who were randomly assigned to a

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<sup>19</sup> Benson, A. D., Johnson, S. D., Taylor, G. D., Treat, T., Shinkareva, O. N., & Duncan, J. (2004). *Distance learning in postsecondary career and technical education: A comparison of achievement in online vs. on-campus CTE courses*. St. Paul, MN: National Research Center for Career and Technical Education. <http://136.165.122.102/mambo/content/view/192/>

<sup>20</sup> Ausburn, L. (2004). Course design elements most valued by adult learners in blended online education environments: an American perspective. *Educational Media International*, 41(4),327-337. <http://test.scripts.psu.edu/users/k/h/khk122/woty/OnlineAdultLearners/Ausburn%202004.pdf>

<sup>21</sup> Graham, C. R., & Dziuban, C. D. (2008). Core research and issues related to blended learning environments. In J.M. Spector, M.D. Merrill, J.J.G. Van Merriënboer, & M.P. Driscoll Eds., *Handbook of research on educational communications and technology* (3rd ed.). Mahwah, NJ: Lawrence Earlbaum Associates. <http://cdl.ucf.edu/research/rite/publications/>

<sup>22</sup> U.S. Department of Education, Office of Planning, Evaluation, and Policy Development. (2010). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. Washington, D.C. Retrieved from <http://ccrc.tc.columbia.edu/Publication.asp?UID=796>

coach were more likely to persist during the treatment period, and were more likely to still be attending the university one year after the coaching had ended. Coaching also proved a more cost-effective method of achieving retention and completion gains when compared to previously studied interventions such as increased financial aid.<sup>23</sup>

**Use of evidence in program development and delivery.** Because manufacturing employers across the country report that their employees often lack the fundamental math and employability skills necessary to be successful, CHAMP will develop new, contextualized tools to assess these skills that will benefit the industry nationally, as well as an improved math fundamentals for manufacturing course. Throughout the development process, the advisory committee will use as many existing openly licensed courses and tools that are grounded in research as possible, while contextualizing those resources to the needs of Colorado's manufacturers. When new tools are developed, e.g., the MOOC to teach and assess students' employability skills, a careful evaluation will be conducted to ensure the usefulness of these deliverables, and if beneficial, they will be made available to other colleges and industry associations.

The proposed coaching and online learning strategies are grounded in strong evidence of their effectiveness. The development of employer-driven curriculum will reflect the most up-to-date data about the skills that manufacturing employees need. During the first year of the grant period, content related to personal effectiveness and academic competencies of advanced manufacturing will be integrated into each consortium college's program. During the second and third years, the workplace, industry-wide technical and industry-sector technical competencies will be added, along with management competencies and occupation-specific requirements. During the second year of the grant, all colleges will also be prepared to offer internships and hands-on learning experiences for their manufacturing students. MSU Denver will also begin

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<sup>23</sup> Bettinger, E., & Baker, R. (2011). *The effects of student coaching in college: An evaluation of a randomized experiment in student mentoring*. The National Bureau of Economic Research, Working Paper No. 16881.

accepting transfer students who are latticing into its bachelor's programs.

## **II. STACKED AND LATTICED CREDENTIALS. 1. Industry engagement to identify credentials.**

To close the gap between employers needs and training that is currently available, manufacturers and their industry associations will provide the guidance for CHAMP activities to support enhanced curricula and training programs. Currently, there are 27 employers who have committed to participating in CHAMP and additional manufacturers will be recruited throughout the grant period. The industry-created manufacturing association, the Colorado Advanced Manufacturing Alliance (CAMA), is also committed to CHAMP. CAMA is actively identifying policy and regulatory reforms that will attract manufacturers to the state, as well as helping manufacturers learn how to access and secure financing. Each consortium institution includes employers on its advisory board/committee to solicit ongoing feedback about how well its courses meet industry needs and that feedback is used to modify courses accordingly. Each participating employer has agreed to remain engaged in sharing feedback about the course redesign throughout the grant period to ensure that the various programs teach the content necessary for students to gain stackable, industry-recognized credentials.

An example of the way that employers will be engaged is how PCC is working collaboratively with the Pueblo Workforce Center to actively engage six of Pueblo's largest manufacturing employers and continues to reach out to approximately 30 other smaller employers in the region to identify gaps in Southern Colorado's manufacturing workers. As a result of employers input, PCC developed 565 hours of curricula in advanced manufacturing skills that can be taught onsite at employers' locations by using mobile learning labs. These changes resulted in 113 people completing training and receiving a credential—180% of the number of students it expected.

**Plans to stack and lattice credentials.** Each participating institution has existing manufacturing

credentials that can be stacked. In addition, many of the credentials issued by each institution can be latticed both within the institution's other manufacturing programs, as well as across the consortium. For example, AIMS has four levels of certifications within its industrial technology AAS degree and those entire credentials lattice into the machining programs at four consortium colleges. RRCC is offering three levels of precision machining certificates that can stack into a precision machining AAS degree and a bachelor's degree in mechanical engineering technology at MSU. These certificates can also lattice into industrial maintenance at CCD or engineering technology at PCC. LCC's welding certificates can be latticed into any Colorado program that uses common courses numbering. CCD's National Institute for Metalworking Skills (NIMS) intermediate machining technologies certificate can lattice into an AAS in either Computer Numerical Control (CNC) manufacturing or CNC management. CCD's CNC tool operator certificate lattices into an AAS in either CNC manufacturing or CNC management. Also, it can lattice into EGTC's CCD machine technology program. CCD's basic welding certificate and intermediate welding certificate are sequential, stackable certificates, and both can also stack to a fabrication welder certificate or arc welder certificate, which lattice to AAS in fabrication welder at CCD or EGTC. CCD's intermediate mechanical certificate can lattice to an AAS in engineering graphics. FRCC's precision machining technology credentials can lattice with FRCC's certificates/degrees in welding, electro-mechanical and energy technology (EMET), CAD and a planned certificate in rapid prototyping. FRCC's students can lattice these credentials with AIMS' oil & gas technologies and industrial technology certificates and can transfer those credits toward an AAS degree in machining at CCD, RRCC and PCC. All of the colleges in the consortium will lattice their advanced manufacturing programs to MSU Denver's engineering degree.

**Specific credentials.** The majority of the credentials offered by consortium institutions are

industry-recognized, and any new credentials developed during the grant period will be validated by the industry partners. The following are the credentials to be made available through CHAMP: basic certificate in manufacturing and certified production technician. The following credentials are grouped by manufacturing occupations:

***Machining:*** Industrial maintenance certificate (CCD); CNC certificate (PPCC); basic machining (PPCC); manual machining (PCC); CNC machining (PCC); inspection (PCC); intermediate machining (PPCC); NIMS-related Certificate (PPCC); NIMS (National Institute for Metalworking Skills) Levels I (CCD, FRCC), Level II (CCD), and Level III (CCD) (these are sequential and stackable at CCD, FRCC); MAC/CAD certificate (PPCC); Levels 1–3 of manufacturing quality control (RRCC) that are sequential and stackable; Swiss screw machine, RRCC); 5-Axis (RRCC).

***Welding:*** Fast track (PCC); Level 1 SMAW (CCD, LCC); Level 2 GTAW (CCD, LCC); Level 3 Pipe (CCD, LCC) (these are sequential and stackable at LCC); shield metal arc welding (CCD); gas tungsten arc welding (CCD); these are recognized by the American Welding Society.

***Engineering Graphics/CAD:*** 3D printing/additive manufacturing certificate (new, AIMS); machining/CAD certificate (PPCC); ELT/CAD certificate (PPCC); engineering graphics basic mechanical certificate (CCD); engineering graphics intermediate mechanical certificate (CCD).

***Mechatronics/Electro-mechanical:*** electro-mechanical (PCC)

***Manufacturing Building Trades:*** pre-manufacturing certificate (EGTC)

***Supervisory Positions Within Manufacturing:*** Supervision in industry (CCD)

**Prior learning assessment.** Standardized placement exams (e.g., ACT, SAT, PARCC, Smarter Balance, Compass and Accuplacer) are used to assess students' knowledge and determine course placement. Students will be able to earn credit from prior learning (CPL) through standardized testing, challenge exams, portfolio assessments and third party assessments. ACE military

training credit recommendations will be applied to the prior learning of veterans and active military, and CAEL will help the institutions evaluate additional training. Military personnel will have their military coursework evaluated to determine courses that can transfer into the program.

In addition, CHAMP will enhance its ability to award CPL by partnering with CAEL. For 39 years, CAEL has worked with colleges and consortia to develop and implement CPL policy and procedures based on practices that are transparent and academically sound. The portfolio assessments tied to industry-driven skill requirements (described above) will permit students and navigators to easily identify and document the content that they have already mastered so they can receive college credit. CAEL will bring this expertise and experience, and in particular its recent multi-institution, state-based work, to assist the consortium develop common policies and practices, building their capacity to assess and award college-level credit for prior learning, with particular emphasis on applied technical learning and on establishing common CPL-specific transfer and articulation agreements. CAEL's veterans-specific assessments and tools will be used to supplement ACE evaluations and help consortium members improve their capacity to serve and support veteran students. In addition, CAEL has found that both building awareness of CPL opportunities and providing support for students are critical to the success of CPL programs, so emphasis will also be placed on building the colleges' capacities for outreach and providing staff with professional development so they can accurately award CPL.

**III. TRANSFERABILITY AND ARTICULATION. Plan to strengthen transitions from non-credit to credit-bearing courses.** CHAMP institutions are committed to working with other institutions to facilitate transferability of non-credit courses to credit-bearing courses, including CPL. Every consortium institution has transfer agreements with at least one other college. CHAMP's advisory committee will review curricula so that the modified courses lead to greater acceptance across CHAMP certificate and degree programs. Because of CHAMP's navigators and

interactive career map, students will learn how courses in their particular manufacturing program will transfer across the partner institutions, including MSU.

**Transitions to college coursework, including transferability between other institutions.** All consortium colleges have articulation agreements with at least one four-year university. Six of the nine colleges have existing articulation agreements with MSU (students who have earned an Associate of Arts or Associate of Science degree from a Colorado community college will, by definition, have completed the MSU Denver General Studies program). In 2012–13, 176 students from the consortium’s community colleges transferred to MSU Denver. CHAMP will streamline students’ experience when transferring courses from a community college to MSU Denver by cross walking the community college’s manufacturing courses that will automatically transfer toward a bachelor’s degree in engineering from MSU Denver. During the first year of the project, MSU Denver will assess the certificate programs offered at the community colleges to provide guidance on the content that needs to be added so students will need to take fewer courses after they transfer to MSU Denver. Currently, MSU allows students to complete 40% of its certificate programs at a different college. In addition to MSU Denver, consortium colleges also have articulation agreements with other colleges. For example, AIMS has articulation agreements for its industrial technology and CAD programs with Franklin University and Regis University.

**Articulation strategies.** Several consortium colleges are developing new articulation agreements with MSU Denver. **Arapahoe Community College (ACC)** and MSU are refining their agreement (effective for five years) so that ACC’s students who have completed all requirements for an associate’s degree in manufacturing who transfer to MSU are classified as juniors when they complete the following two courses in addition to the cross walked courses: MET 1010 Manufacturing Processes and MET 1310 Principles of Quality Assurance. A transfer and

articulation coordinator will work with MSU Denver, and other 4-year institutions offering degrees that benefit a manufacturing pathway, to develop inter-institutional agreements for a guaranteed transfer of credits, certificates and degrees.

**IV. ONLINE AND TECHNOLOGY-ENABLED LEARNING. Incorporation of technology into program.** Manufacturing education requires a level of hands-on training that is difficult to master solely through online delivery methods. However, online and/or hybrid learning will be available as often as possible to reduce some of the barriers that prevent TAA-eligible workers from continuing their educations, and all of the courses developed or refined through CHAMP will be licensed using Creative Commons and will become part of the CCCS common courses, making them available to any of the system's 13 community colleges. Examples of the consortium college's specific plans include the following: PCC will be hybridizing courses and integrating simulation software and equipment within four of its programs: production technician, machining, welding and electro-mechanical. PCC's intends to create technology-enabled learning environments for each of its manufacturing disciplines that mimic a manufacturing shop floor with simulation components. AIMS will convert its existing courses to an online format and will add system simulation software allowing online students to work on virtual mechanical systems, e.g., pneumatics. PPCC will enhance its electro-mechanical technician program related to soldering, robotics and basic electronics with hybrid delivery techniques. CCCS will hire an instructional design coordinator and two curriculum designers to serve as a resource to the consortium colleges as they redesign their courses to hybrid and online learning. The instructional design team will work onsite at the colleges with faculty. The instructional design coordinator will also teach college staff how to maintain online/hybrid courses so they can be modified to address employers' changing needs. Navigators will be instrumental in teaching students how to be successful in online courses.

In addition, CHAMP includes the web-based, interactive career map (described earlier), as well as the development of three MOOCs (described above).

Advanced technology will be used to coordinate all of CHAMP's key stakeholders throughout Colorado. The CAVEA (a theater equipped with 21<sup>st</sup> century technology) will host quarterly meetings. The CAVEA will allow CHAMP partners to convene remotely and participate fully. The CAVEA supports four overhead projectors that display images on side walls consisting of white boards. In addition there are three back projectors capable of projecting virtual 3-D images. A remote participant will be able to see the data display regardless of which surface it is projected. WebEx can accommodate one hundred remote users.

**Expected impact of technology.** Because students will be training with the equipment that employers expect them to be knowledgeable about, CHAMP will increase students' career options. Also, several consortium colleges are proposing online/hybrid learning, which aids in student retention. The hybrid learning model along with flexible open labs will allow incumbent workers and students to apply online learning to their hands-on manufacturing program.

**V. STRATEGIC ALIGNMENT. Coordination with Governor's state workforce plan.** Because of manufacturing's importance to Colorado in terms of exports (\$16.3 billion annually in economic output), the governor strongly supports innovative projects that will lead to the creation of highly skilled, high paying jobs in manufacturing. Global shifts in the manufacturing landscape are putting Colorado at the forefront of bringing advanced manufacturing back to the United States. In fact, Colorado is one of eight states that account for 30% of the total U.S. manufacturing gross domestic product. Colorado is focused on job creation in manufacturing through focused recruitment of new manufacturers.<sup>24</sup> For these reasons, Colorado's governor has prioritized manufacturing as one of its most important industries to support. In October 2012, Colorado

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<sup>24</sup> Sparks, E., & Waits, M. (2013). *Making our future: What states are doing to encourage growth in manufacturing through innovation, entrepreneurship and investment*. National Governor's Association. Retrieved from [www.nga.org/center](http://www.nga.org/center)

received federal recognition and hosted a regional town hall meeting for the National Network of Manufacturing Innovation.

Colorado Office of Economic Development and International Trade, with input from 20 manufacturing employers across Colorado, identified advanced manufacturing as one of 15 key industries for the state in its Blueprint Business Plan. The state's vision is to make Colorado a global hub of advanced, diverse and competitive manufacturing, with a favorable business environment. That plan included six goals with associated deliverables to support advanced manufacturing in the state: 1) build a manufacturing business-friendly environment; 2) recruit, grow and retain manufacturing business; 3) increase access to capital; 4) create and market a stronger Colorado brand for manufacturing; 5) educate and train the future workforce; and 6) cultivate innovation and technology.<sup>25</sup> Three of the community colleges included in this consortium (FRCC, RRCC and PCC) are strategic partners on the governor's blueprint plan.

Colorado has already undertaken significant amounts of work to brand manufacturing as an attractive career choice. This work includes engaging the industry to develop key outreach messages for a variety of audiences, including TAA-eligible workers, women and veterans; and coordinating outreach with community colleges and workforce centers. CHAMP furthers the governor's priorities by targeting returning veterans who possess many of the key skills needed to fill the skills gap in the manufacturing talent pipeline—making them an ideal target population for CHAMP. Veterans possess maturity, discipline and the ability to work effectively in groups and in leadership positions. In addition, many veterans have undertaken extensive technical training, resulting in skills that could be easily transferred to manufacturing positions.

Recognizing the importance of manufacturing in Colorado and lack of a pipeline of skilled employees, the legislature passed House Bill 1165 in 2013, which creates a K–postsecondary

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<sup>25</sup> Colorado Office of Economic Development and International Trade. (2013). *Colorado Blueprint*. Retrieved from, [www.advancecolorado.com/blueprint](http://www.advancecolorado.com/blueprint).

education manufacturing pathway that is aligned with the skills needed by industry and includes credit for prior learning, industry-validated stackable certificates and multiple entry/exit points to continued education. CHAMP and its community college partners will continue to participate in the development of this pathway. To date, participation by consortium members has included attending a 2013 Sector Summit and serving on a sectoral partnership focused on manufacturing. The sectoral partnership has begun working with national and local organizations such as the Manufacturing Skills Standards Council, CAMT, Manufacturing Innovation Center, Adams County Education Consortium, Jefferson County Manufacturing Consortium and Work Keys to identify employees' critical competencies. Once this information is gathered and analyzed, it will be used to develop recommendations for adopting common standards for career readiness for target occupations. These recommendations will be reflected in CHAMP's work.

In addition, Colorado intends to develop a manufacturing career planning toolkit relevant for educators, training providers, students and workers. A model workplace experience for middle/high school students will also be created to expose young people to manufacturing careers. Based on needs expressed by manufacturing executives, Colorado is also creating a capital resource portal to connect industry with capital resources. The state is also looking into creating a fund of private investment capital to be channeled toward high-growth companies in industry sectors including advanced manufacturing.

**Coordination with employers and industry organizations.** CHAMP boasts an active consortium of manufacturers and those employers will continue to provide input to each consortium college as it identifies gaps in the curricula. For example, in 2011, CCD partnered with 30 aerospace manufacturers e.g., Lockheed Martin and Ball Aerospace, to identify the industry's needs. This process led CCD to determine that a more comprehensive manufacturing technician program and skilled soldering workers were needed by that industry. The following

table shows *examples* of the employers’ contributions to CHAMP (specific commitments of each employer are described in its letter of commitment):

Employer	Institutional partner	Ident. skills	Develop curric.	Define goals	Provide resources	Host interns	Develop pathway	Mentor faculty	Hire
Leprino Foods	AIMS	✓	✓	✓					
GeoTech	CCD	✓	✓	✓		✓			✓
Alfred Manufacturing	CCD & EGTC	✓	✓	✓	✓	✓	✓	✓	✓
Mountainside Medical	CCD/FRCC	✓	✓	✓		✓	✓	✓	✓
Fauston Tool	FRCC	✓	✓	✓					
Intrex Aerospace	FRCC	✓	✓	✓		✓	✓	✓	✓
Metalcraft Industries	FRCC	✓	✓	✓	✓	✓			
Airgas	LCC	✓	✓	✓	✓			✓	
SEMCO	LCC	✓	✓	✓		✓			✓
Miller Coors	MSU	✓	✓	✓		✓		✓	
EVRAZ	PCC	✓	✓	✓		✓			✓
GCC Rio Grande (Grupo Cementos de Chihuahua-USA).	PCC	✓	✓	✓					
Vestas Towers America	PCC	✓	✓	✓	✓		✓	✓	✓
JPM Prototype & Mfg. Co.	PPCC	✓	✓	✓		✓			✓
Quantum	PPCC	✓	✓	✓				✓	✓
Accu-Precision Tool and Gauge, LLC.	RRCC	✓	✓	✓					✓
Stacy Machine and Tooling, Inc.	RRCC	✓	✓	✓		✓	✓		✓

In addition, CHAMP will leverage its partnership with CAEL to deliver a train-the-trainer workshop and coaching that helps each community college design an enhanced strategy and approach for heightened and effective employer engagement. The workshop design will leverage the decision-making modeling offered through CAVEA.

**Coordination with the public workforce system.** CHAMP includes 10 workforce centers that will play several critical roles in this project. To ensure that the workforce system is fully engaged, most CHAMP navigators will be co-located at the regional workforce center and the college. The position will serve as a liaison between students and their career as they advance

through the program, whether they are encountering barriers related to participation in online programs, identifying apprenticeship, internships or job placement. The following table shows CHAMP’s workforce center partners and their roles:

Public Workforce Partner by Region and/or Colorado County	Institution Partner	Workforce Center’s Role					
		Identify/Refer TAA-Eligible Workers	Link Workers to Credit-Bearing Courses	Connect to Employers	Provide Support Services	Track TAA-Workers	Institutional Advisory Board Member
Adams	CCD and EGTC	✓	✓	✓	✓	✓	
Arapahoe-Douglas	CCD and EGTC	✓	✓	✓	✓	✓	
Boulder	FRCC	✓	✓	✓	✓	✓	✓
Denver	CCD and EGTC						
Larimer	FRCC	✓	✓	✓	✓	✓	
Pikes Peak	PPCC	✓	✓	✓	✓	✓	✓
Pueblo	PCC	✓	✓	✓	✓	✓	✓
Southeast	LCC	✓	✓	✓	✓	✓	
Tri-County	RRCC	✓	✓	✓	✓	✓	✓
Weld	AIMS	✓	✓	✓	✓	✓	✓

CWDC will engage the regional workforce centers and coordinate conveners for CHAMP quarterly meetings held in the CAVEA. CWDC will provide technical assistance through coaching and training, facilitating communication and aiding collaboration.

**Coordination with other organizations.** Consortium institutions have well-established partnerships with nonprofit agencies. These human service agencies, particularly those whose mission is job placement, will provide support services and recruit/make referrals to CHAMP. Project navigators will also work with nonprofits to recruit participants to the colleges’ manufacturing programs. For example, Goodwill Industries has agreed to partner with PPCC to provide input on integrating employability training into the college’s CAD, electronics, machining and welding courses. Goodwill will also provide job coaching services to PPCC’s students. The Denver Office of Economic Development is working with nonprofits, including the

Denver Housing Authority, to recruit youth to its summer Advanced Manufacturing Youth Academy. Those agencies will be leveraged for CHAMP, as well.

**VI. ALIGNMENT WITH PREVIOUSLY-FUNDED TAACCCT PROJECTS.** Colorado received a three-year Round 1 TAACCCT grant, Colorado Online Energy Training Consortium (COETC), to develop degree and certificate training for incumbent workers and job seekers in the energy industry. As part of this endeavor, the participating institutions developed industry-recognized credentials in electrical, mechanical, welding, MSHA safety and First Responder training. There is significant crossover of these subject areas with manufacturing, and thus that work will contribute to CHAMP's implementation. In addition, TAA- COETC funds are supporting the construction of additional mobile learning labs, which will be available for CHAMP. Colorado also received a Round 2 TAACCCT grant to increase access of TAA-eligible workers in allied health occupations. Both of those grant recipients have agreed to work with CHAMP's staff to provide guidance, mentoring and lessons learned. CHAMP partners will contact other relevant TAACCCT recipients from Round 1 and 2 to determine where there might be synergy in their efforts and this project's activities. Specifically, CHAMP will contact the principal investigator of Missouri's MOwins project, a Round 2 TAACCCT grantee, because it is similar in scope and industry to CHAMP and has learned information about how to effectively develop employer-driven curriculum and internships. The information that previous grantees learned will be disseminated by CHAMP as part of the professional development it provides to faculty, navigators and advisory committee members. Representatives of these earlier TAACCCT projects will be invited to participate as speakers at the monthly advisory committee meetings.

## VII. PROJECT WORK PLAN

<b>Priority 1:</b> Increase attainment of degrees, certifications, certificates, diplomas, and other industry-recognized credentials that match the skills needed by employers to better prepare TAA-eligible workers and other adults for high-wage, high-skill employment or re-employment in growth industry sectors				
	<b>Activities</b>	<b>Implementer(s)</b>	<b>Costs</b>	<b>Time/Milestones</b>
Strategy 1.1	A. Redesign the current Credit for Prior Learning system	The Colorado Community College System; CHAMP CPL College Director; CAEL; consortium colleges; CHAMP advisory committee	Strategy Total: \$422,272 Equipment: \$0 Year 1: \$255,000 Year 2: \$82,400 Year 3: \$84,872 Year 4: \$0	Start Date: 10/1/2013 End Date: 9/30/2016  <b>Milestones:</b> Review Policy and develop new CPL policy Identify the competencies for the five regions in the consortium Align competencies to DOL industry model Design enhanced CPL support for veterans Design process for collecting data for CPL and tracking student progress
Strategy 1.2	B. Develop employer-driven manufacturing curriculum and certificates to include the alignment of workplace math competencies; develop curriculum for NIMS certifications; and develop/approve MSSC Certified Production Technician certificate (PPCC)	Colleges (FRCC, AIMS, CCD, LAMAR MSU, PCC, PPCC, RRCC); partnering manufacturing employers; CAEL; lead program instructional designer and lead program curriculum designer; manufacturing faculty at CHAMP member colleges; CHAMP advisory committee	Strategy Total: \$6,878,871 Equipment: \$6,077,131 Year 1: \$402,851 Year 2: \$300,152 Year 3: \$98,737 Year 4: \$0	Start Date: 10/1/2013 End Date: 4/30/2015  <b>Milestones:</b> <b>Deliver 25</b> advanced manufacturing certificates aligned with industry standards and competencies.  Deliver NIMS aligned curriculum  <b>Deliver the MSSC certified production technician certificate</b> as an approved certificate.

	C. Increase articulation and transfer agreements	The Colorado Community College System; CHAMP Transfer/Articulation Coordinator	Strategy Total: \$92,727 Equipment: \$0 Year 1: \$30,000 Year 2: \$30,900 Year 3: \$31,827 Year 4: \$0	Start Date: 10/1/2013 End Date: 9/30/2016  <b>Milestones:</b> The number of manufacturing program articulation agreements will increase by 33% 300 advanced manufacturing students will transfer or articulate to a 4-year institution.
Strategy 1.3	D. College navigators increase student success for college retention, completion and employment outcomes in manufacturing	All consortium member institutions; navigators; CHAMP program navigator coordinator, instructional design coordinator; online curriculum specialist; workforce centers; advisory committee.	Strategy Total: \$1,387,377 Equipment: \$0 Year 1: \$468,558 Year 2: \$482,845 Year 3: \$484,358 Year 4: \$0	Start Date: 2/1/2014 End Date: 9/30/2016  <b>Milestones:</b> College navigators develop a traditional and/or an online student success course specific to manufacturing. College navigators teach the student success course Lead program staff will collaborate with the navigators to develop curriculum for course. Develop career success for manufacturing curriculum with employment resources for the student success course.
<b>Priority II:</b> Introduce or replicate innovative and effective methods for designing and delivering instruction that address specific industry needs and lead to improved learning, completion, and other outcomes for TAA-eligible workers and other adults				
	<b>Activities</b>	<b>Implementer(s)</b>	<b>Costs</b>	<b>Time/Milestones</b>
	A. Develop Hybrid Online courses	All consortium member institutions	Strategy Total: \$ 185,311 Equipment: \$0 Year 1: \$40,285 Year 2: \$104,741 Year 3: \$40,285 Year 4: \$0	Start Date: 10/1/2013 End Date: 9/30/2016  Milestones: Develop online student success course Convert appropriate courses from lecture to online format

	Develop 3 MOOCS	Instructional design coordinator; program online curriculum specialist; CAEL	<b>Strategy Total:</b> \$ 132,941 <b>Equipment:</b> \$0 <b>Year 1:</b> \$40,285 <b>Year 2:</b> \$52,371 <b>Year 3:</b> \$40,285 <b>Year 4:</b> \$0	<b>Start Date:</b> 2/1/2014 <b>End Date:</b> 2/1/2015 Develop MOOC for new credit for prior learning policy, portfolio templates and professional development for college advisors, workforce center staff and community service organizations. Develop a math MOOC for incumbent workers and students that will transfer to MSU Denver. Develop a MOOC for employment skills
	Build portfolio templates for advanced manufacturing	CAEL in partnership with the CHAMP consortium	<b>Strategy Total:</b> \$47,000 <b>Equipment:</b> \$0 <b>Year 1:</b> \$47,000 <b>Year 2:</b> \$0 <b>Year 3:</b> \$0 <b>Year 4:</b> \$0	<b>Start Date:</b> 2/1/2014 <b>End Date:</b> 2/1/2015  <b>Milestones:</b> Develop and implement the portfolio templates for advanced manufacturing
<b>Priority III: Demonstrate improved employment outcomes</b>				
	<b>Activities</b>	<b>Implementer(s)</b>	<b>Costs</b>	<b>Time/Milestones</b>
<b>Strategy 3.1</b>	A. Develop employment skills for CHAMP participants	Instructional design coordinator; online curriculum specialist; all consortium member institutions; Pueblo Workforce Center; CWDC; local workforce center internship coordinators	<b>Strategy Total:</b> \$528,322 <b>Equipment:</b> \$0 <b>Year 1:</b> \$ 173,010 <b>Year 2:</b> \$176,080 <b>Year 3:</b> \$179,233 <b>Year 4:</b> \$0	<b>Start Date:</b> 10/1/2013 <b>End Date:</b> 9/30/2016  <b>Milestones:</b> Develop an employment soft skills assessment for CHAMP participants Develop job search resource guides

Strategy 3.2	B. Build an advanced manufacturing interactive career map	CAEL; navigators; employers; all consortium member institutions; College in Colorado	Strategy Total: \$585,072 Equipment: \$0 Year 1: \$585,072 Year 2: \$0 Year 3: \$0 Year 4:0	Start Date: 10/1/2013 End Date: 9/30/2014  <b>Milestones:</b> Provide online support for manufacturing jobs
	C. Internship coordinator/ employer outreach	All consortium member institutions; college internship & employer outreach coordinators; workforce centers; CAMA	Strategy Total: \$528,322 Equipment: \$0 Year 1: \$173,010 Year 2: \$176,080 Year 3: \$179,233 Year 4: \$0	Start Date: 10/1/2013 End Date: 9/30/2014  <b>Milestones:</b> Internship profiles will be developed for jobs that are relevant in manufacturing 300 internships or apprenticeships will be developed

### 3. OUTCOMES AND OUTPUTS. I. ANALYSIS OF OUTCOME PROJECTIONS

Outcome Measure	Targets for all Participants	
<b>1. Total Unique Participants Served</b>	Year 1: 374 Year 2: 702 Year 3: 709	Total: 1,785
<b>2. Total Number of Participants Completing a TAACCCT-Funded Program of Study</b>	Year 1: 163 Year 2: 467 Year 3: 500	Total: 1,130
<b>3. Total Number of Participants Still Retained in their Program of Study or Other TAACCT-Funded Program</b>	Year 1: 121 Year 2: 373 Year 3: 305	Total: 799
<b>4. Total Number of Participants Completing Credit Hours</b>	Year 1: 154 Year 2: 569 Year 3: 586	Total: 1,309
<b>5. Total Number of Participants Earning Credentials</b>	Year 1: 148 Year 2: 425 Year 3: 457	Total: 1,030
<b>6. Total Number of Participants Enrolled in Further Education After TAACCT-funded Program of Study Completion</b>	Year 1: 37 Year 2: 161 Year 3: 213	Total: 411
<b>7. Total Number of Participants Employed After TAACCT-funded Program of Study Completion</b>	Year 1: 74 Year 2: 221 Year 3: 273 Year 4: 237	Total: 805
<b>8. Total Number of Participants Retained in Employment After Program of Study Completion</b>	Year 1: 62 Year 2: 179 Year 3: 224 Year 4: 196	Total: 661
<b>9. Total Number of Those Participants Employed at Enrollment Who Received a Wage Increase Post-Enrollment</b>	Year 1: 96 Year 2: 203 Year 3: 232 Year 4: 235	Total: 766

**Targets.** The numerical targets outlined above provide estimates based on projections from consortium institutions' experience serving the needs of manufacturers, along with the input of workforce partners. CHAMP members have identified targets, project deliverables and budget needs to meet a timeline that is ambitious, yet attainable.

**II. SYSTEM OR PROCESS FOR TRACKING AND REPORTING OUTCOME MEASURES. Existing tracking procedures.** FRCC and its partner colleges currently capture data on all of the required outcomes. FRCC's data analyst, in collaboration with its Office of Institutional Research, will

compile data needed for reporting. FRCC and all other consortium colleges, with the exception of EGTC, use the Banner system, which can disaggregate outcome data for TAA individuals. FRCC will assign a specific cohort code to CHAMP participants so data can be examined.

FRCC will use the National Student Clearinghouse Database to track the outcomes of CHAMP students who transfer to other institutions. In addition, the consortium is experienced with tracking students' employment through the VE-135 process, which can note retention following employment for all TAA-funded participants in manufacturing occupations from point of employment to second and third quarter retention of employment, and gather feedback regarding increases in pay based on completion of degree/certificate training.

**Plan to address tracking gaps.** There are no gaps between the information that the consortium institutions collect and the outcomes required by the DOL. Consortium institutions will provide monthly financial reports and quarterly program reports to FRCC, which FRCC will analyze and compile for reports to DOL and other stakeholders.

**III. USING DATA FOR CONTINUOUS IMPROVEMENT. Plan for formal data reviews.** CHAMP and Rutgers, the third-party evaluator, will develop a well-defined plan for formal and ongoing data reviews. A rigorous outcome and implementation evaluation has been developed to ensure CHAMP has data to inform student outcomes and impact as well as steps taken to create and implement the program. The appended full evaluation plan documents timelines associated with each data collection methodology. Student outcome data will be collected and reported on quarterly to provide institutions and partners with regular updates about progress toward goals. Additionally, data will be collected at the end of each school year, allowing a thorough and in-depth look at how the program was implemented, and how that coincides with student outcomes. The program director, Rutgers, and the advisory committee will engage in quarterly conference calls to review student outcome data. Additionally, the advisory committee will meet annually in

person with previously mentioned parties to participate in data reviews and recommendations for overall project implementation. **How decisions will be made about adjustments to the program.** The program director, leadership team and advisory committee will annually review evaluation data and fulfillment of commitments defined in the consortium agreement. The leadership team will be comprised of five manufacturing employer partners from the sector partnerships represented by CHAMP, the president of CAMA, the director for the Colorado Association for Manufacturing and Technology, the director of CWDC, the assistant director for the Colorado Office of Economic Development and International Trade, the director for trades in career and technical education for the Colorado Community College System Office, one senior administrator from each CHAMP member institution, and one representative from each workforce center represented by CHAMP.

The advisory committee will be comprised of 10 manufacturing employers, one CHAMP manufacturing program faculty and all CHAMP program staff. These staff and committee members will develop an action plan with detailed next steps for program adjustments based on a review of the data that will be shared with CHAMP partners.

**How progress/improvement in programming will be assessed.** Modifications to the program resulting from the recommendations from the action plan will be documented in the evaluation plan. The evaluation methodologies will account for and track program improvements and enhancements and how they impact student outcomes and program implementation. These data and information will then be incorporated into the next reporting cycle. ***How this information will be shared amongst consortium members.*** Evaluation results will be disseminated in the CHAMP networks in order to share strengths and lessons learned. Employers will be asked to share their feedback about the demonstrated competencies of the graduates that they hire. CHAMP's ability to close the skills gaps that employers note will be shared across all involved

manufacturing associations. CHAMP consortium members will participate in all sessions via CAVEA or in person, and at least two staff members from FRCC will attend two face-to-face events in Washington, D.C. These events provide opportunities to network; share lessons learned and become acquainted with strategies from other programs.

**Sustainability Plan.** The outcome evaluation will student indicator data to determine successful program outcomes, while the implementation evaluation will track steps and activities taken by the institutions to implement the program. By triangulating the data and utilizing both outcome and evaluation methods, CHAMP program staff and college project managers will have information to determine which strategies and activities are effective and should be sustained.

Colorado's legislature appropriated \$1,033,765 and 1.5 FTE for the development of Colorado's manufacturing pathway. This funding will be leveraged to reduce the cost of sustaining CHAMP's activities where there is overlap with what the state is already doing, e.g., business partnership summit, career pathway program design, faculty/staff development to implement curriculum and assessments, and statewide promotion of manufacturing careers. CHAMP strategies that are sustained beyond the grant period will be supported by the participating institutions' general funding with course updates made to reflect new advancements in the field or employers' changing needs. By making existing programs more accessible and attractive, CHAMP institutions project an increase in enrollment and increased tuition revenue to sustain these programs in the future.

Additionally, employer partnerships are invaluable to CHAMP institutions, as they provide resources, feedback on programs and commit to hiring graduates. Institutions will strive to continue those employer partnerships beyond the grant period so that manufacturers' input is continually integrated into future curriculum enhancements.

**4. ORGANIZATIONAL PROFILE AND PROJECT MANAGEMENT.** FRCC, the largest community

college in Colorado with three campuses and one satellite location, will lead the CHAMP consortium and coordinate all partners' activities. FRCC is governed by the CCCS board. FRCC's service area stretches from the city of Denver to the Wyoming border and from the Continental Divide to rural, eastern Colorado, encompassing 49% of the state's total population. In 2012, FRCC served 20,489 students. FRCC awards Associate of Arts and Associate of Science degrees, which satisfy the lower division transfer requirement for four-year universities. It also offers the Associate of Applied Science degree and offers over 110 certificates. Serving as lead applicant and fiscal agent for this program, FRCC will provide general oversight for the project and collaborate with consortium institutions to accomplish the proposed objectives, strategies and deliverables. FRCC will be responsible for reporting to the DOL on the status of deliverables, ensuring timely progress is being made toward project goals and ensuring that funds are being reported, reconciled and requested in accordance with grant regulations.

**Qualifications of the project manager.** FRCC will hire a *full-time project manager* within 30 days of award notification. In the interim, Stacey Hogan, the Executive Director of Strategic Planning and Resource Development will serve as the project manager. The successful candidate must have experience effectively managing projects of similar size and scope. Preference will be given to candidates who have experience working with community colleges, managing grant programs with multiple partners, as well as those with knowledge of manufacturing job-training programs. At a minimum, the program director will have a bachelor's degree in project management, or a bachelor's degree with a minimum of three years of related experience. The program director will be responsible for the day-to-day management of CHAMP, including serving as the central liaison to the other colleges in the consortium; monitoring the implementation of project activities and outcomes to ensure they are completed on time and within budget; developing, distributing and collecting financial and performance data from each

CHAMP partner; and writing and filing all required reports to DOL.

**How lead institution will track the programmatic, fiscal, and administrative progress, and**

**provide them with technical assistance and training.** FRCC has extensive experience

administering restricted funds, including several federal grants. It also has experience working

with industry partners to expand technical programs relevant to Northern Colorado's economy,

most recently successfully managing a \$4 million H-1B Technical Skills Job Training Grant that

started in 2012. In the first year, FRCC established five strong partnerships in healthcare,

information technology (IT) and health IT. FRCC has been the recipient of additional funds from

the DOL as a consortium member of Colorado's TAACCCT Round 1 grant.

FRCC has well-honed administrative capabilities and will employ its fiscal and accounting

services, human resources administration, budgeting/contracts department and technology

services to support CHAMP. FRCC will hire a full-time consortium project manager within 30

days of award notification. FRCC's program manager will have primary fiscal responsibility for

the grant and will authorize all program related expenses. In addition, FRCC will hire two full-

time accountants to provide fiscal management services to consortium members. They will be

supervised by FRCC's restricted fund accountant coordinator who is responsible for budgetary

compliance and reports to the fiscal services controller.

FRCC also has in place the needed administrative policies and procedures to inform the

management of program records related to participant data, program information and grant

performance. FRCC uses the Banner System to track financial and student information. This

system is reconciled with the state of Colorado accounting system on a monthly basis. Monthly

reports of all grant revenues and expenditures are available through the Banner System. Within

this database, accounts will be set up for each consortium partner so that project expenditures can

be easily tracked. The program director will regularly monitor the project budget to ensure grant expenditures are permissible and aligned with CHAMP's objectives.

FRCC will provide WebEX webinars for technical assistance and training, provide monthly conference calls with consortium institutions, program staff, and review expectations for open source licensing, evaluation requirements and required DOL reports.

**Roles of consortium member institutions.** Consortium institutions will provide all of the training programs for CHAMP's TAA-eligible students, and provide all data required to measure the project's outcomes to FRCC. Each college will hire a project manager and a college/workforce navigator to support CHAMP's activities. A navigator outreach coordinator will be hired to provide leadership to all college CHAMP navigators outreach to nonprofit agencies, workforce centers, secondary institutions and leadership and oversee the college navigators. CAEL will develop the portfolio template and assessment rubrics for manufacturing, the interactive career map and provide professional development; focusing on an introduction to prior learning and faculty assessor training. Employers will remain engaged throughout the grant period by the employer outreach coordinator, as well as by the staff at their associated college, who will advise on the training program's ability to competently train workers, and will provide feedback about the skills of the graduates that they hire from CHAMP's programs. The Colorado Department of Labor and Employment and regional workforce centers will play an integral role in the implementation of this project. Each of the workforce centers will provide outreach to employers to ensure that graduates of the CHAMP's programs are placed in manufacturing jobs. In addition, the workforce partners will coordinate the development of processes to identify customers with skill sets suitable for training and will supervise the implementation of these processes at all workforce centers. Case managers from the workforce centers will refer clients to CHAMP's manufacturing programs and help to place students in

internships and employment. Collaboration between community colleges and workforce centers will include: customized hiring events/job fairs for groups of graduates; individual job development for graduates; and improved processes to increase the number of TAA clients enrolled in CHAMP's education/training programs. CHAMP's collaboration with **Colorado Workforce Development Council (CWDC)** will also be a critical liaison to the eight regional sector partnerships that are focusing on manufacturing in Colorado. CWDC will help CHAMP leverage the work of these sector partnerships to support the project's outreach, growth and sustainability. CWDC will also ensure the strategic alignment between career pathways and sectors, and across all major partners. To do this, CWDC will convene monthly meetings with key representatives from the sector partnerships.

**Qualifications of the fiscal, administrative management and marketing staff.** FRCC's *grant compliance manager* will ensure institutional grant management oversight for regulatory compliance. The position works with CHAMP Grant Administrator and consortium college project managers to ensure accountability to meet performance and fiscal reporting requirements. **FRCC's data analyst (.5 FTE).** This position will produce technical research reports and provide findings to the project team and external evaluator. At a minimum, the data analyst will have a bachelor's degree in mathematics or finance, or a bachelor's degree with a minimum of three years of experience related to data analysis including experience compiling large research datasets from statistical databases, including IPEDS and NCES, using SPSS. FRCC has also identified two accounting staff (Accounting Coordinator I and Accounting Coordinator II) and a CHAMP Program Director to complete the program administration team. These positions also require a bachelor's degree with a minimum of three years of experience related to the respective grant administration or accounting positions. All of the *CHAMP consortium program personnel* listed in the budget will be part of the program coordination.

**Marketing Staff.** CHAMP will be marketed to students, employers and workforce center partners by each college's navigator and outreach staff. In addition, the interactive career map will be used as a platform where prospective students can find out more about the various programs, requirements for admission, costs, who to contact, and many other tools to support their exploration and application to the institutions and/or programs. Additional project staff members necessary to implement CHAMP are included in the budget and budget narrative.

**Management structures.** As the lead applicant, FRCC has created a strong management plan to lead CHAMP. FRCC will communicate on at least a quarterly basis with consortium members. The CHAMP leadership team (which includes at least one representative from each consortium member institution) will meet quarterly, or as often as needed, in person or via the CAVEA during the first year and quarterly thereafter to discuss project status. The CHAMP advisory committee, which will meet annually (face-to-face in 2014 and by conference call in 2015 and 2016) and more often if necessary, will review the progress of all consortium partners and contractors. It will recommend necessary revisions to the project timeline and if appropriate engage in problem solving and decision making based on evaluation data about the overall performance of the project. A project listserv, hosted by FRCC with ongoing postings by the program director, will keep stakeholders informed. The annual in-person workshops described above will be held in the Denver area. An organizational chart that depicts CHAMP is appended.

**Systems and processes for required reporting.** FRCC has experience managing federal grants—\$7,180,572 to date. It has systems in place to provide timely and accurate financial and performance reporting on its federal grants, including an Employment & Training Administration grant. No federal grant funds have ever been withheld for failure to file reports. FRCC's fiscal policies are governed by CCCS' fiscal policies and procedures. Fiscal controls are in place at FRCC to ensure funds are administered and allocated in accordance with federal, state

and institutional laws and policies. Budgetary issues that are discovered by FRCC will be brought to the attention of the CHAMP consortium project manager within 10 business days. Monthly budget and reconciled reports will be on file and available to the consortium members.

FRCC, as a member institution of CCCS, is governed by State Board for Community Colleges and Occupational Education policy, CCCS policy and state of Colorado policies and procedures in its fiscal operations. As a result, FRCC is included in an annual A-133 financial audit completed by the CCCS system. The completion of the FY 2012 audit revealed that FRCC had no audit comments and is in compliance with all fiscal rules. FRCC maintains all financial records in accordance with generally accepted accounting principles.

While FRCC is a part of a Round 1 TAACCCT grant, it was not the lead applicant for this grant. FRCC centralizes all of its grants administration within a single grant compliance office that monitors all grants. The FRCC grant compliance manager will train the FRCC CHAMP program manager and grant administrator in the college's grant management protocol within five days of being hired. FRCC will share with all key staff at consortium institutions the relevant portions of its handbook that outlines all grant compliance policies so administrators know how to track time and effort, and understand the applicable laws and regulations related to federal grant compliance with EDGAR and OMB circular practices.

**Procurement processes.** FRCC is governed by the CCCS board and complies with all state and system procurement procedures related to purchasing and contracting. All purchases must be made on written purchase orders and must be properly coded. FRCC's Purchasing Director is authorized to approve purchase orders. For all grant-related funds, the restricted fund accountant will review the appropriateness of the expense. Financial reporting on DOL grants is processed through the grant compliance manager to ensure accuracy in reporting. All consortium members will be required to abide by their respective procurement rules.