# STEM Early College Expansion Partnership (SECEP)

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Introduction: Absolute and Competitive Preference Priorities

The STEM Early College Expansion Partnership (SECEP) – led by the National Center for Restructuring Education, Schools and Teaching (NCREST) at Teachers College, Columbia University, in partnership with Jobs for the Future (JFF), the Middle College National Consortium (MCNC), and school districts in Connecticut and Michigan – proposes to improve STEM education in the partner districts by increasing high-quality professional development for teachers in STEM subjects. Over five years, SECEP will address the goal of Absolute Priority 2 – Improving Science, Technology, Engineering and Mathematics (STEM). SECEP will improve STEM education for 22,000 high need middle and high school students, including students in rural areas, decreasing drop-out rates and boosting college enrollment. SECEP will further improve underrepresented populations’ access to STEM careers by increasing the number of students enrolling in dual credit STEM courses and pursuing postsecondary credentials.

Specifically, SECEP will increase high quality professional development for teachers in STEM subjects in target schools in the partner districts by scaling Early College High School (ECHS) professional development strategies. The ECHS model – validated through rigorous study as significantly increasing the success of underrepresented and high-need students in demanding college-preparatory programs of study – blends high school and college coursework in a supportive environment to set many more students on a clear path to college and career success. Over the past 10 years, the number of ECHS has grown to almost 300, serving over 100,000 students, including 30% that are STEM Early College High Schools, which focus explicitly on improving student outcomes in STEM fields. SECEP will scale STEM ECHS designs in five districts across two states, increase the preparation for teachers in STEM subjects and raise high school and postsecondary success rates in STEM fields for high need students by:
1) Implementing comprehensive, standards-based STEM-focused curricula and student projects that provide a bridge to STEM postsecondary studies and careers; 2) delivering professional development and coaching to improve the effectiveness of middle school, high school, and college STEM teachers through activities that build STEM and pedagogical content knowledge; and 3) developing school, district, and college partnerships to fully implement the STEM ECHS design, with a focus on the professional development platform.

In doing so, NCREST and its SECEP partners will draw upon the ECHS professional development platform refined over the past decade, and the collective experience of NCREST, MCNC and JFF in supporting the development of STEM ECHS nationwide. SECEP will also draw upon the expertise of NCREST STEM specialists in providing STEM discipline course work to practicing teachers and in STEM professional development to diverse districts.

SECEP also meets Competitive Preference Priority 3—Supporting Novice i3 Applicants, as Teachers College, Columbia University has never received a grant under this program.

A. Significance

Addressing Unmet Demand. If the United States is to remain a global economic leader, we need to grapple with three interrelated unmet needs – the growing labor market demand for a STEM qualified workforce; the low number of high school students that are proficient in STEM and college graduates with a STEM degree or credential, exacerbated by a persistent achievement gap; and the paucity of highly skilled teachers in STEM fields. We describe these needs below.

Nationally, there is a demand for a workforce that can meet the requirements of STEM-related fields, which is driving demand for proven strategies to increase student achievement and teacher effectiveness in STEM. With 2.4 million job openings in STEM projected in the U.S. through 2018, we must focus on college and career readiness in STEM for all of our youth,
especially since 92 percent of these critical STEM careers will require some postsecondary education (Carnevale, et al, 2011). **But despite this economic demand, student interest and achievement in STEM disciplines have remained stagnant.** Only about 14% of undergraduates are enrolled in STEM studies, and STEM postsecondary students are more likely than non-STEM students to be foreign, young, and from families with income in the top 25% or with parents who had some college education in STEM (IES, 2009). There are few proven models that have demonstrated success in increasing student achievement in STEM fields, particularly among low income students and students of color.

The need to boost student achievement in STEM is recognized in both Connecticut and Michigan, where business and policy leaders are rightly concerned that a robust STEM workforce is essential for a competitive economy (Carnevale, et. al, 2011). In both states, current initiatives are driving demand for effective designs to accelerate the academic advancement of students in STEM and their success in postsecondary education and in STEM career fields. Both states have also responded by creating structures such as STEM councils, task forces and commissions, new legislation, and initiatives to engage higher education and industry. Connecticut has passed SB 840, *Next Generation Connecticut*, which allocates more than $1.5 billion to the University of Connecticut over the next 10 years with the objective of improving and growing the University’s programs in bioscience, engineering, technology, digital media, and other in-demand fields. In Michigan, the state in 2011 launched the “12 by 12, Michigan Enhanced Dual Enrollment System Pilot: Enhanced Dual Enrollment as a College Readiness Strategy” as a pilot strategy to boost college readiness and achievement in STEM. A coalition of the College Access Network, the MI Community College Association, and the MI Early/Middle College Association has recommended that the state expand this strategy and set a goal that
every high school student earn 12 college credits by graduation.

However, in both states, plans to address educational and workforce gaps collide with the 
**poor levels of achievement of low-income students** who make up the majority of public school enrollment. For example, Bridgeport enrolls a population that is 99% free or reduced price lunch eligible; 57% of high school students performed below proficient on the state science assessment; and 60% performed below proficient on the math assessment. CT also recently eliminated remedial education in college, a change that will exert new pressure on high schools in Bridgeport to ensure that students are better prepared for postsecondary education.

A further, critical problem is the **paucity of teachers who possess the content knowledge and pedagogical skills required to spark students’ interest and engagement in STEM learning.** There is a dearth of teachers who are well prepared in STEM content and STEM pedagogical content knowledge (NCES). Teachers in STEM fields receive too little recognition, compensation, and professional development (National Science Teachers Association, 2012). Many are working without the proper certifications; others may need assistance to use instructional methods and frameworks associated with high quality STEM teaching and good student outcomes. In some cases, even those who are certified may lack important depth of knowledge, both of the content itself and how to teach it effectively.

This need to increase STEM content and STEM pedagogical knowledge among teachers is underscored not only by low achievement rates in STEM, but also by the **adoption of Common Core standards that will necessitate stronger connections between high schools and postsecondary institutions.** For years, the country has struggled to come to terms with and implement solutions to staggering achievement gaps between students based on race, ethnicity, and income, and persistently low achievement rates for low-income students. The Common Core
State Standards (CCSS) and the Next Generation Science Standards—national education standards that provide a consistent, clear understanding of what students are expected to learn in public schools—seek to level the playing field for all students by standardizing expectations and therefore ensuring that no matter where a student goes to school, she will gain the same skills and knowledge as students elsewhere across the country. However, implementation of common standards across states will create unprecedented pressures for schools to align curricula and instruction to college expectations and to perform at much higher levels. ECHS, proven to close achievement gaps between advantaged and disadvantaged students, are ideal settings in which to develop/refine curricula and instructional methods to address these new standards.

The STEM ECHS design and this project are exceptionally well positioned to meet the demand for quality STEM education, address the significant needs to improve STEM instruction through professional development, and reach beyond the proposed level of scale. STEM ECHS integrate high school and college and propel under-represented student populations to success in academically rigorous content, including programs that lead to a credential in STEM and related fields, and central to SECEP are goals and activities that enhance the skills, content knowledge, and pedagogical strategies utilized by teachers in STEM disciplines.

**Feasibility of Future Scaling.** The partners for this project have the capacity for accelerating the adoption of STEM ECHS, including its professional development platform, nationwide. JFF, through extensive state policy efforts, the ECHS national network (including 250 schools across 28 states), and its current work in school development and professional development, is uniquely positioned to further scale the proposed practices and designs. MCNC, as a membership organization that supports school partnerships in districts and postsecondary institutions nationwide, is also uniquely positioned to scale the project. Leveraging our respective networks,
we will establish cross network learning exchanges and a dissemination strategy to share best practices, tools, and policy frameworks that support STEM ECHS expansion, including a blueprint we will develop for district-wide STEM ECHS expansion for use by other LEAs. In addition, states implementing high standards and assessments need proven models to increase the number of high-need students who succeed in college-preparatory courses and are on-track for high school and college graduation. ECHS’s positive impact on student achievement, including increasing graduation rates and closing achievement gaps, is well supported by two rigorous research studies that meet the moderate level of evidence threshold outlined in the i3 regulations and the What Works Clearinghouse (see Appendix D). Because of this track record, the states of Maryland, Michigan, and New York have invested in ECHS and the STEM ECHS design, including P-TECH, a variant of STEM ECHS that prepares graduates for well-paying careers in IT. Further evidence of demand for ECHS, particularly STEM ECHS, is JFF’s current expansion work with Denver, Chicago, and several school districts in both Massachusetts and South Texas that will reach over 35,000 new students. In addition, MCNC has a key role in implementing STEM ECHS in Michigan and South Carolina and coordinates a national ECHS network of highly effective schools. With such momentum and interest across multiple states and districts, favorable outcomes from this project will further position STEM ECHS and its professional development platform for national expansion.

B. Quality of Project Design

Meeting the Priority and National Need Through an Evidence-Based Design. Developed and refined over the past decade, the ECHS model features a set of core design elements: 1) a rigorous academic program, including a coherent instructional framework aligned to college-ready standards and engaging instruction, including project- and inquiry-based learning; 2) a
head-start on college, including an aligned sequence of college courses and support as part of the high school program of study, that both challenges and inspires students; 3) comprehensive wraparound student supports; and 4) organizational structures and practices that drive and sustain these reforms, including strong secondary-postsecondary partnerships, teacher collaboration, job-embedded professional development for secondary school and college faculty, and a strong college-going culture.

There exists a compelling and growing body of evidence that ECHS and STEM ECHS increase the preparation of underrepresented and high-need students for rigorous academic, collegiate-level programs (see Appendix D). ECHS students are more likely to be on-track for college, have better attendance and fewer suspensions, graduate from high school, and enroll in postsecondary education (Edmunds et al., 2012; American Institutes of Research & SRI International, 2013; Edmunds, et al, 2013). These results remain consistent in STEM ECHS designs. During 2010-2011, among 60 STEM ECHS, 25% of students who graduated earned an Associate’s degree by the time of high school graduation, and 90% of graduates went on to enroll in postsecondary education in the fall following graduation, including 66% who enrolled in a four-year college or university (ECHS Student Information System, 2012). Further, schools in Texas that integrate STEM with ECHS (T-STEM) have been part of a high-validity quasi-experimental study conducted by SRI International, and results show that students in early college and T-STEM schools in Texas consistently outperformed students in comparison schools on state assessments, including math, and in college preparatory classes (SRI, 2011).

Building upon this evidence base, SECEP will scale the proven STEM ECHS design, featuring comprehensive professional development and coaching, in one urban district in Connecticut and four regional school districts in Michigan using three strategies:
1. **Implement the ECHS STEM design** aligned to college-ready standards and a clear sequence of STEM college courses. The design includes extensive academic and personal support from peers and adults to help students achieve success in college preparatory and college courses (including advisories, individual learning plan, tutoring, counseling and advising) and by setting and reinforcing the expectation that all students will prepare for, enter, and graduate with a college degree, credential or certification. The design helps students understand the practical issues of transitioning to college and pursuing STEM options for postsecondary education and provides comprehensive college application and financial aid advising and assistance.

2. **Deliver and Embed Professional Development and Coaching.** An integral part of the STEM ECHS design is ongoing professional development and coaching support for teachers, administrators, and district officials to enhance instruction and supports so that all students are prepared to complete courses at a college-ready standard. High-quality job-embedded professional development and coaching improves instructional capacity, implementation of effective instructional strategies, and leads to increased student achievement (Neuman, S.B.; Cunningham, Joyce and Showers; Neufield and Roper; Poglinco et al).

3. **District Coherence and College Partnerships.** A central component of SECEP is helping district leadership align professional development, school improvement initiatives, and resources with schools’ implementation of STEM ECHS design. Strong partnerships with higher education partners enables shared responsibility collaboration in planning and professional development. These partners play an integral role in sustainability and continuous improvement.

**Project Goals, Objectives, Activities and Outcomes.** The following logic model summarizes SECEP’s activities, design elements, and projected student outcomes of the proposed project.
SECEP has organized its activities under three goals, aligned to the strategies described above.

**Goal 1:** Improve STEM instruction by scaling STEM ECHS designs to increase the opportunities for students’ access to STEM postsecondary studies and careers. SECEP will scale up STEM ECHS designs within high-need regions of MI and CT, building on the experience of LEAs in these regions and their commitment to use STEM ECHS as a district-wide strategy to improve STEM instruction and college- and career-readiness and success for all.

**Objective 1:** Scale STEM ECHS designs, including a professional development and coaching platform, in four intermediate districts in Michigan (serving 11 member LEAs in total), including 12 high schools and 14 feeder middle schools.

**Objective 2:** Scale STEM ECHS designs, including a professional development and coaching
platform, in 3 high schools and 5 feeder middle schools in Bridgeport, CT.

**Activities.** Working in MI and CT provides the opportunity to apply and validate the STEM ECHS design in new contexts in two low-income, high need regions, ultimately reaching 22,000 students. Districts have been selected based on a process confirming the support of key stakeholders and their commitment to adopting the STEM ECHS Design. NCREST, JFF, and MCNC will facilitate implementation of STEM ECHS through up-front design consultation and technical assistance to districts and college partners on refinement of core design elements. Assistance will focus on: college and community/business partnerships; alignment of secondary and postsecondary STEM course sequence and pathways; student supports; curriculum development; project-based learning; data sharing; and budget development.

Further, SECEP partners will provide comprehensive technical assistance and deliver the STEM ECHS school/district coaching platform. This will include: working with district leadership and their college partners to define roles and responsibilities of the district and college (including new operational, staffing, and financial models and frameworks); developing a strategic plan for the expansion effort; delivering technical assistance in instructional program design; designing the courses of study (aligning secondary and postsecondary STEM courses); facilitating curriculum development and project-based learning; assisting to develop data sharing requirements, student support systems, and community partnerships; facilitating cross-district peer-learning; and delivering the ECHS professional development platform to ensure the instructional coherence needed to help students complete college courses by graduation.

**Goal 2: Expand STEM ECHS high quality professional development in STEM subjects to increase teachers STEM content and pedagogical content knowledge.** SECEP will engage STEM teachers in professional development that increases their content and pedagogical content
knowledge, and boosts their effectiveness in engaging underserved and underrepresented students through project and problem-based learning.

Objective 1: Provide external and job-embedded professional development to teachers to improve STEM instruction.

Objective 2: Engage secondary and postsecondary teachers in planning and collaborating to deepen content and pedagogical content knowledge.

Activities: Lack of success in science is often a result of the way it is taught and not students’ ability to do well (Schulman, 1986). SECEP provides a comprehensive professional development program – a three-year sequence of instructional leadership, coaching, trainings, and support services that has shown success at driving implementation of a STEM-based, college-ready academic program for all students. The program enables teachers and school leaders to implement and sustain a coherent, and research-based approach to instruction that accelerates students to a college-ready standard. A key feature of the model is a focus on subject matter content knowledge, pedagogical content knowledge (such as student-centered practices), and curricular knowledge through embedded professional development support for teachers, administrators, and district officials to enhance instruction and supports.

To embed the professional development platform and ECHS STEM design, MCNC and JFF will provide leadership coaches who will build capacity of district instructional coaches and teacher leaders in schools. Coaches will model and institutionalize collaborative professional development strategies and transition facilitation to teachers identified by each school. School planning teams comprising school leadership, district staff, and higher education faculty will provide a structure for continuing collaboration, including assessment of progress and continuous improvement training and professional development. This structure will sustain the collaboration
following the end of the project. During the five years, NCREST will work with schools and districts and will provide a template for sustaining the data review process.

SECEP will also facilitate college and high school faculty collaboration, which will increase the content knowledge and pedagogical content knowledge of the high school and college teachers, and produce rigorous curriculum rubrics that align with the CCSS and college goals. SECEP partners will use district-wide institutes, school-based curriculum planning sessions, and college-school faculty curriculum meetings to build knowledge of STEM subjects and pedagogy, and bring coherence to secondary school-to-college STEM curriculum and instruction.

To further increase teachers’ pedagogical content knowledge in STEM areas, SECEP will provide support for collaborative learning, curriculum embedded performance assessments, problem-based learning (through which students apply their STEM content knowledge to the design of solutions), and project-based learning, in which students investigate an idea in STEM disciplines and produce a product such as a research paper. SECEP will provide institutes and workshops that engage teachers in developing their pedagogical content knowledge with regard to STEM so that they utilize such practices, and job-embedded coaching will focus on improving classroom practice to ensure that implementation issues are addressed.

Finally, SECEP will create a community of practice (COP) for schools, districts, colleges, and partners that will facilitate knowledge sharing within and across districts and create a platform for disseminating resources that spur and support further expansion nationally. Cross-regional peer-learning will be a part of the COP through occasional in-person and more frequent sessions using technology, including webinars and an extranet. Also, through documentation and dissemination efforts, SECEP partners will provide opportunities for LEAs and states to learn about STEM ECHS expansion and the platform of services, resources, and tools being created.
Goal 3: Build key partnerships with districts and postsecondary institutions to position STEM ECHS designs for sustainability in the CT and MI LEAs and establish these districts as exemplars for further scale-up within their regions, statewide, and nationally.

Objective 1: SECEP partners will build the capacity of all SECEP districts and their schools to sustain implementation of STEM ECHS partnerships and designs beyond the grant period.

Objective 2: Document implementation to support future strategies for scale-up and partnership development in other districts, regions, and states.

Activities: SECEP partners recognize that districts must develop the capacity to sustain these reforms beyond the term of the i3 grant. To that end, SECEP expansion activities will strengthen district-level functions and collaborations with their higher education, business, and community partners needed to implement the STEM ECHS design and raise achievement to college-ready standards in a cost-effective manner. This work will include: building data and assessment systems that track student progress to college readiness and support continuous improvement; developing formal processes for using student data to refine instruction; restructuring curriculum sequences and student supports around the STEM ECHS design and college-ready standards; developing and maintaining college and community partnerships; and creating district-based capacity to implement and sustain the ECHS professional development model by creating a corps of district-based instructional coaches. Further, building on experience in creating STEM ECHS nationwide, SECEP will build capacity within the central office, among the instructional superintendents and coaches in each of the districts, and at each of the participating schools, to sustain the design and expand it beyond the grant to other secondary schools within the two regions. Finally, SECEP will identify and address policy and other barriers to implementation.

SECEP will also document strategies and lessons across the two regions to inform future
district-wide scale-up efforts, as well as the launch of STEM ECHS networks in additional states. This will include design briefs and case studies focused on critical topics of implementation and sustainability such as district-wide early college financing models for covering college course costs and the use of data to support instructional improvement. NCREST will leverage its current projects and future initiatives to reach national networks of LEA leaders and state policymakers and will target this audience to disseminate outcomes and best practices from the SECEP.

**Outcomes.** During the five-year grant period, we anticipate the following outcomes:

- A total of 22,000 students served by schools adopting the STEM ECHS design;
- 70-80 secondary and postsecondary teachers trained in and utilizing STEM ECHS content, pedagogical content knowledge, and curriculum and instructional strategies;
- 85% of teachers who have been completed SECEP professional development report ability and confidence to apply STEM content and pedagogical content knowledge in the classroom;
- At least a 10 percentage point increase in students taking and succeeding in core college preparatory courses;
- At least a 10 percentage point higher rate of graduation than comparison group students;
- 90% of students will earn college credit; at least 60% of high school graduates will complete two STEM college courses as part of a pathway transferable to postsecondary credentials;
- A blueprint for district-wide STEM ECHS expansion that can be used by other LEAs, particularly in regions with demographic characteristics similar to the two regions; and
- A 50% increase in students who evidence an interest in STEM and pursuing a STEM career.

**Barriers to Scale.** The SECEP partners have not yet expanded STEM-ECHS strategies at a broader scale because of a combination of resource and policy constraints. While NCREST, JFF, and MCNC have been working independently with networks of ECHS and ECHS STEM
schools, we have not to date had the resources to combine our collective expertise to rapidly expand and test the comprehensive STEM professional development and coaching model we propose. Relatedly, the districts we have worked with, including districts in CT and MI, while poised to implement the ECHS STEM model district-wide, have lacked the up front, initial investments necessary to prepare and support a cadre of teachers, implement curriculum alignment, and forge effective collaborations. SECEP will use grant funds to address these resource gaps at the national partner and local district levels, enabling intensive design, professional development, technical assistance and implementation efforts that will demonstrate the efficacy of ECHS STEM implementation across multiple districts.

An additional barrier to scale nationally, and in MI and CT, are state policies and funding formulas that have not been conducive to incorporating college courses into high school, particularly for high need students, nor supportive of colleges, employers, or schools working together to cultivate students’ interest in and preparation for STEM career paths. While some local innovators have forged the partnerships needed to build STEM-Early College pathways, they have largely done so in spite of state policy, rather than being encouraged by state policy and leaders. But there are indications that this is changing, nationwide and within the two states we are targeting. Last year, the MI legislature approved changes to two dual enrollment laws so that students are eligible to take up to 10 college courses during grades 9-12, and CT’s P-20 Council is encouraging collaborative local efforts between schools and colleges. SECEP partners will capitalize on this growing interest to further educate and encourage policymakers to promote STEM-ECHS. Drawing upon JFF and MCNC’s experience in state capacity building, SECEP will work with state and district leaders to build policy conditions that: 1) promote dual credit course-taking, including funding formulas and eligibility requirements, that are supportive
of all students advancing into college-level work; 2) promote student access to counseling, mentoring from STEM professionals, and other supports for high need students; 2) increase access to quality work-based learning activities; 3) establish metrics and goals for post-secondary and STEM-related credentials; and 4) develop priority STEM industry sectors for pathways based on state economic development objectives. This strategy will not only significantly eliminate barriers in MI and CT, but will open up significant opportunity for SECEP to work with additional states that have set STEM education as both an economic and education priority.

C. Quality of Management Plan

The SECEP project will draw on the extensive expertise and management experience of NCREST/Teacher’s College (TC) and its technical assistance partners, who share a long-term commitment to the development of projects related to STEM and early college high schools. Teacher’s College is a leader in STEM education and pedagogy that engages students and advances their learning. NCREST in particular has contributed to the continuous improvement of early college high schools as well as research on these schools. JFF has been the lead organization nationally in the development and diffusion of the ECHS model since 2002, and is involved in a wide range of projects related to improving access to STEM education across the P-20 education system. MCNC is the original source of the early college model. Their member schools were pioneers in creating schools co-sponsored by secondary and postsecondary entities that have propelled thousands of traditionally underserved students to enter/ succeed in college.

The SECEP management plan and structure draws on systems developed in all three organizations during decades of experience managing complex, multi-year education reform projects. NCREST’s Project Director and lead staff for this project have extensive expertise overseeing complex, multi-partner grant projects, and they will collaborate closely with MCNC,
JFF, and the partnering LEAs and colleges to ensure effective delivery of services, strong implementation, and high quality scaling of the design. Each partner has a clearly defined role and has designated an experienced project director and team directly responsible for the project.

Using TC’s Office of Sponsored Programs and Grants and Contracts Office systems in place for all aspects of the management process, the Project Director will manage and track tasks, deliverables, timelines, outcomes, and budgets at all levels of implementation. These systems are backed up by regularly scheduled NCREST project reviews to assess technical, schedule, and budget progress/issues. NCREST/TC will manage all sub-grants to official partners and monitor the expenditure of all funds, including the required private match of federal grant dollars.

**Management Structure and Process.** NCREST Associate Director Dr. Elisabeth Barnett will serve as Project Director. She will manage NCREST staff and oversee the work of the partners to ensure the sound delivery of design, technical assistance, and professional development services. She will have ongoing access to NCREST senior leadership, including Co-Director Jacqueline Ancess. Dr. Barnett will manage NCREST’s internal operations team who will provide financial and administrative services to ensure the successful execution of the management plan.

SECEP’s principal management vehicle will be the **multi-partner project leadership team.** Directed by Dr. Barnett, the leadership team will include: JFF Vice President Dr. Joel Vargas, who will oversee JFF’s school design and professional development efforts, as well as lead the policy work related to this project; Dr. Cecilia Cunningham, Executive Director of the MCNC, who will lead that organization’s professional development services to schools, districts, and colleges, and the superintendents who will oversee their district’s SECEP scaling efforts: Paul Vallas (Bridgeport Public Schools, CT); Michael Koster (Delta-Schoolcraft Intermediate School District, MI); Linda Hagel (Genesee Intermediate School District, MI); Steven Zott,
Lapeer County Intermediate School District, MI); and **Scott Menzel** (Washtenaw Intermediate School District, MI). (See Qualifications of Key Personnel below and Appendix F).

The SECEP work plan will be tracked using a collaborative online project management system ([Basecamp](https://basecamp.com)) that will be accessible to all partner teams and will ensure project oversight and delivery through integrated planning, management, and communication. The project leadership team will convene monthly by conference call or teleconference to review activities and accomplishments, upcoming milestones, potential challenges, and project solutions to ensure that work plan objectives will be achieved on time and within budget.

Reporting to Dr. Barnett at NCREST are three Teachers College faculty members who will provide expertise and guidance for the professional development activities of SECEP and the policy work related to this project. They are: Dr. Chris Emdin, Assistant Professor of Science Education; Dr. Erica Walker, Associate Professor of Mathematics and Education; and Dr. Ellen Meier, Associate Professor of Computing and Education. The NCREST project team will also include: Dr. Fenot Aklog, Director of Evaluation, who will direct NCREST’s technical support services to schools and documentation of key practices; Dr. Jennifer Kim, Senior Research Associate, who will lead NCREST’s delivery of data project/continuous improvement services; Grazyna Hulacka, NCREST’s Grants Manager, who will manage contracts, financial and reporting functions; and a Project Associate who will provide administrative support.

Reporting to Dr. Vargas at JFF will be: Associate VP Dr. LaVonne Sheffield, who will oversee JFF’s district and school design and professional development services to schools, districts, and colleges; Associate VP Dr. Michael Webb, who will direct JFF’s documentation and peer learning services, as well as school/district design technical assistance; Dr. Caesar Mickens, who will manage JFF’s professional development services; and Dr. Sara Freedman,
who will lead JFF’s instructional coaching delivery.

Reporting to Dr. Cunningham at MCNC will be: Dr. Chery Wagonlander, Director of the Michigan Early/Middle College Association, an organizational affiliate of MCNC, who will direct MCNC’s school design and professional development services in Michigan; Burt Rosenberg and Terry Born, MCNC Coaches, who will provide school coaching and technical assistance services; and Adana Collins, who will provide project management assistance.

In Bridgeport, the project will be directed by Superintendent Paul Vallas. In Michigan, four Intermediate School District Superintendents – Michael Koster, Linda Hagel, Steven Zott, and Scott Menzel– will direct STEM Early College implementation across their respective member school districts. The chart below shows the organizational structure of this project.

**Metrics and Continuous Improvement.** SECEP’s work plan will incorporate key metrics and emphasize ongoing assessment of progress using well-developed data and feedback loops. The
metrics of interest in this project are closely aligned with the elements of the logic model and will be fully defined within the first six months of project implementation. Metrics will include interim measures of progress in implementing the various pieces of the model at the level of the three partners, the districts, and the schools. For example, we will set targets for the numbers of teachers that coaches will work with, and we would expect teachers to make changes in key aspects of their classroom practice. Data on these points would be gathered, brought back to the project leadership team, and discussed; adjustments in course would be made when appropriate.

SECEP will also closely track progress toward the attainment of the student outcomes listed in the logic model using two sources of information. Using data provided by participating schools, NCREST will prepare twice-yearly reports on student progress in college courses as well as student progress in STEM-related milestones. In addition, the evaluator will provide periodic reports on student outcomes in relation to a comparison group. This information, as it becomes available, will be the focus of high-priority discussions in leadership meetings. In addition, the school-specific information will be provided to each school and district and reviewed in workshops set up for the purpose of using data for continuous improvement.

**Operating Model and Plan; Timelines and Milestones.** Using the management structure, workplan monitoring, partner communications, and continuous improvement processes described above, SECEP will achieve the following milestones according to the timeline indicated.

<table>
<thead>
<tr>
<th>Year 1 Milestones</th>
<th>Parties Involved*</th>
<th>Indicator of Accomplishment</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signed agreements</td>
<td>NCREST, MCNC, JFF, LEAs, Colleges</td>
<td>MOU, data agreements</td>
<td>Q1-2</td>
</tr>
<tr>
<td>Implement/outcome metrics and data indicators/timelines</td>
<td>NCREST, MCNC, JFF, LEAs, Colleges</td>
<td>Management plan</td>
<td>Q1-2</td>
</tr>
<tr>
<td>Staff hiring plans set</td>
<td>NCREST, MCNC, JFF,</td>
<td>Management plan</td>
<td>Q1-2</td>
</tr>
</tbody>
</table>

**Legend:**
*NCREST – National Center for Restructuring Education, Schools, and Teaching, Teachers College; MCNC- Middle College National Consortium; JFF- Jobs for the Future*
| LEAs, Colleges | LEAs, NCREST, MCNC, JFF, Colleges | Management plan, MOU | Q2-3 |
| LEAs, Colleges | MCNC, JFF | Management plan | Q2 |
| LEAs, Colleges | NCREST, MCNC, JFF | Agenda, PD materials | Q2-4 |
| LEAs, Colleges | NCREST, MCNC, JFF, LEAs, Colleges | Agenda, PD materials | Q3-4 |
| LEAs, Colleges | NCREST, MCNC, JFF | Management plan | Q3 |
| LEAs, Colleges | JFF, MCNC | Coach reports | Q3 |
| LEAs, Colleges | LEAs | Coach reports | Q3 |
| LEAs, Colleges | LEAs, MCNC, JF | Coach reports | Q2-3 |
| LEAs, Colleges | LEAs, MCNC, JFF | Agenda, meeting materials, meeting and reporting schedule | Q3 |
| LEAs, Colleges | LEAs, MCNC, JFF | Academic plan, scope and sequence | Q2-3 |
| LEAs, Colleges | NCREST, JFF, MCNC | Data dashboard, data analysis report template | Q3 |
| LEAs, Colleges | SERVE | Revised evaluation plan and schedule | Q2-4 |

### Year 2 Milestones

| LEAs, Colleges | NCREST | Planning agendas, written descriptions, content outlines | Q1 |
| LEAs, Colleges | JFF, MCNC, LEAs, Colleges | Report | Q1-2 |
| LEAs, Colleges | JFF, MCNC | Coach reports | Q1-4 |
| LEAs, Colleges | LEAs | Coach reports | Q1-4 |
| LEAs, Colleges | LEAs, JFF, MCNC, College, Employers | Coach reports, Academic plan, scope and sequence, syllabi | Q1-4 |
| LEAs, Colleges | NCREST, MCNC, JFF | Agenda, PD materials | Q2-4 |
| LEAs, Colleges | NCREST, MCNC, JFF, LEAs, Colleges | Agenda, PD materials | Q3-4 |
| LEAs, Colleges | LEAs, Colleges | Academic plan, scope and sequence, syllabi | Q3-4 |
| **Peer learning webinars & regional mtgs begun** | MCNC, JFF, LEAs, Colleges | Agendas, evaluations, copies of materials used | Q1-4 |
| **On-site PD & observational rounds begun** | MCNC, JFF, LEAs, Colleges | Coach report, Agenda, PD materials | Q1-4 |
| **PD institutes for MS teachers launched** | MCNC, JFF, NCREST, LEAs, Colleges | Agenda, PD materials | Q2-4 |
| **Evaluation site visits & surveys launched** | SERVE | Meeting/visit agenda, survey | Q1-4 |
| **Data use professional development for schools and district to identify progress revision and improvements needs** | NCREST | Creation of reports and analyses by NCREST | Q3 |
| **Data Collection** | MCNC, JCC, SERVE | Data agreement, administrative data | Q1-4 |
| **Establish datasets for outcome analyses, collect implementation data** | NCREST | Evaluation plan | Q4 |

**Year 3 Milestones**

| **Targeted on-site PD & rounds** | MCNC, JFF, LEAs, Colleges | Coach reports, agendas | Q1-2 |
| **School based leadership coaching** | JFF, MCNC | Coach reports | Q1-4 |
| **School based instructional coaching** | LEAs | Coach reports | Q1-4 |
| **Implement and assess STEM ECHS designs, courses, pathways, student supports, internships, work experience** | LEAs, Colleges, MCNC, JFF | Coach reports, Academic plan, scope and sequence, syllabi | Q3-4 |
| **PD institutes for hs/college faculty** | NCREST, MCNC, JFF, LEAs, Colleges | Agenda, PD materials | Q3-4 |
| **On-site PD** | MCNC, JFF, LEAs, Colleges | Agenda, PD materials | Q1-4 |
| **PD institutes for MS teachers** | MCNC, JFF, NCREST, LEAs, Colleges | Agenda, PD materials | Q2-4 |
| **Peer learning webinars & regional meetings** | MCNC, JFF, LEA | Agendas, evaluations, copies of materials used | Q1-4 |
| **Data use professional development for schools and district to identify progress need revision/improvement needs** | NCREST | Creation of reports and analyses by NCREST | Q3 |
| **Data Collection** | MCNC, JCC, SERVE | Data agreement, administrative data | Q1-4 |
| **Document enabling conditions/barriers and startup process** | NCREST | Coaching reports, LEA reports | Q-4 |
| **Conduct initial outcome analyses, collect and analyze implementation data** | SERVE | Evaluation plan, Progress report | Q1-4 |
### Year 4 Milestones

<table>
<thead>
<tr>
<th>Activity</th>
<th>Organization(s)</th>
<th>Required Materials</th>
<th>Timeframe</th>
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</thead>
<tbody>
<tr>
<td>PD institutes for hs/college faculty</td>
<td>NCREST, MCNC, JFF, LEAs, Colleges</td>
<td>Agenda, PD materials</td>
<td>Q3-4</td>
</tr>
<tr>
<td>Peer learning webinars &amp; regional mtgs</td>
<td>MCNC, JFF, LEA</td>
<td>Agendas, copies of materials, evaluations</td>
<td>Q1-4</td>
</tr>
<tr>
<td>School based leadership coaching</td>
<td>JFF, MCNC</td>
<td>Coach reports</td>
<td>Q1-4</td>
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<tr>
<td>School based instructional coaching</td>
<td>LEAs</td>
<td>Coach reports</td>
<td>Q1-4</td>
</tr>
<tr>
<td>Implement and assess STEM ECHS designs, courses, pathways, student supports, internships, work experience</td>
<td>LEAs, Colleges, MCNC, JFF</td>
<td>Coach reports Academic plan, scope and sequence, syllabi</td>
<td>Q3-4</td>
</tr>
<tr>
<td>Data Collection</td>
<td>MCNC, JFF, SERVE</td>
<td>Data agreement, administrative data</td>
<td>Q1-4</td>
</tr>
<tr>
<td>Data use professional development conducted for schools and district to identify progress and need for revisions and improvements</td>
<td>NCREST</td>
<td>Creation of reports and analyses by NCREST</td>
<td>Q3</td>
</tr>
<tr>
<td>Conduct outcome analyses, collect and analyze implementation data</td>
<td>SERVE</td>
<td>Evaluation plan</td>
<td>Q1-4</td>
</tr>
<tr>
<td>Dissemination of progress outcomes through presentations, publications</td>
<td>NCREST, MCNC, JFF</td>
<td>Publications, case studies, reports, web content</td>
<td>Q4</td>
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### Year 5 Milestones

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<thead>
<tr>
<th>Activity</th>
<th>Organization(s)</th>
<th>Required Materials</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer learning webinars &amp; regional mtgs</td>
<td>MCNC, JFF, LEA</td>
<td>Agendas, evaluations, copies of materials used</td>
<td>Q1-4</td>
</tr>
<tr>
<td>School based leadership coaching</td>
<td>JFF, MCNC</td>
<td>Coach reports</td>
<td>Q1-4</td>
</tr>
<tr>
<td>School based instructional coaching</td>
<td>LEAs</td>
<td>Coach reports</td>
<td>Q1-4</td>
</tr>
<tr>
<td>Implement and assess STEM ECHS designs, courses, pathways, student supports, internships, work experience</td>
<td>LEAs, Colleges, MCNC, JFF</td>
<td>Coach reports Academic plan, scope and sequence, syllabi</td>
<td>Q3-4</td>
</tr>
<tr>
<td>Data Collection</td>
<td>MCNC, JFF, SERVE</td>
<td>Data agreement, administrative data</td>
<td>Q1-4</td>
</tr>
<tr>
<td>Data use professional development for schools and district to identify progress and revision and improvement needs</td>
<td>NCREST</td>
<td>Creation of reports and analyses by NCREST</td>
<td>Q3</td>
</tr>
<tr>
<td>Evaluation findings</td>
<td>SERVE</td>
<td>Final report</td>
<td>Q1-4</td>
</tr>
<tr>
<td>Scaling Planning</td>
<td>NCREST, MCNC, JFF</td>
<td>Marketing and descriptive materials</td>
<td>Q2-4</td>
</tr>
<tr>
<td>Dissemination of progress outcomes through</td>
<td>NCREST, MCNC, JFF</td>
<td>Web content, presentations, publications</td>
<td>Q3-4</td>
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22,000 new early college students enrolled by end of year 5
The workplan and timeline above reflect a multi-year financial and operating model that will successfully bring the project to scale in the MI and CT regions and institutionalize effective and sustainable structures and practices by the conclusion of the grant period. In Year 1, work in districts will launch quickly, emphasizing intensive planning, goals-setting, district/school design work, and initial leadership and instructional coaching and professional development. Years 2-3 will be the period of most intensive engagement by NCREST, JFF, and MCNC with the STEM ECHS districts and schools (as reflected by the milestones for those years above), addressing implementation, professional development, peer learning, conferences, policy work, and data and evaluation. By the beginning of Year 4, new structures, partnerships, and pedagogical and curriculum approaches will have been established at all schools, and emphasis will gradually shift to refinement, continuous improvement, and dissemination of progress. In Year 5, these emphases will continue, as the SECEP team continues to assess and refine implementation and work together to ensure sustainability. Meanwhile, NCREST, MCNC, and JFF will engage in a range of dissemination efforts as well as planning for further scaling. The accompanying project budget mirrors this implementation arc, with the highest cost periods being Years 2 and 3, and a ramping down of the project budget in beginning in Year 4 and continuing through Year 5.

D. Personnel

Adequacy of Staffing Plan. SECEP has created a management team that excels in leading complex regional, district, and high school reform initiatives. The project will be fully staffed in year one at the lead organization (NCREST), partner TA organizations (MCNC and JFF), and districts. The lead and partner organizations have on staff the mix of expertise and experience – management, school design, professional development, technical assistance, and data expertise – needed to get the project off the ground and implemented successfully.
Qualifications of Project Director and Key Personnel. Dr. Elisabeth Barnett, who will serve as SECEP’s Project Director is the Associate Director of NCREST and is also affiliated with the Community College Research Center and the National Center for Postsecondary Research. Dr. Barnett currently serves as the project director for NCREST’s Middle College National Consortium’s Middle/Early College Research Partnership, which documents the design, development, and operation of the Consortium’s Early College High School Initiative and for NCREST’s Michigan Early Middle College Association Research Partnership, which provides research support aimed at providing formative data collection and analyses to strengthen middle-early college high school design and implementation. She is author or editor of many publications on early college high schools and college and career readiness (see resume).

Also at NCREST/Teachers College: Dr. Chris Emdin, Assistant Professor of Science Education, Director of the Secondary School Initiatives at the Urban Science Education Center, and recipient of the 2008 “Best Paper for Innovation in Teaching” by the Association for Science Teacher Education, is a leading thinker and visionary in K-12 science education reform. Dr. Emdin will provide support for SECEP’s science education professional development activities and the policy work. Dr. Erica Walker, Associate Professor of Mathematics and Education, is a widely published and active K-12 mathematics education researcher. Dr. Walker is co-developer of PRIME (Problem Solving in Mathematics Education), an interactive on-line K-12 mathematics resource designed to serve as a pedagogical and content resource for teachers to provide engaging mathematics experiences. Dr. Walker will provide support for SECEP’s mathematics education professional development activities and the policy work. Dr. Ellen Meier, Associate Professor of Computing and Education and co-Director of the Center for Technology and School Change, is a leading authority on K-12 technology curriculum and
teaching, school leadership and organizational change. Dr. Meier will provide guidance for SECEP’s technology education professional development activities and the policy work.

At JFF: Vice President Dr. Joel Vargas will oversee JFF’s school design and professional development efforts, as well as lead the policy work related to this project. As VP of JFF’s High School Through College division, Dr. Vargas manages a staff of 18 focused on national early college expansion and accompanying PD and instructional coaching services, as well as directs the policy and research agenda to improve the local, state, and national conditions for early college designs. Dr. LaVonne Sheffield, Associate VP of Early College Expansion at JFF, will oversee JFF’s design, partnership, and professional development services to SECEP districts and schools. Dr. Sheffield’s comprehensive experience as a district superintendent (Rockford, IL and Recovery School District Region II, LA) and Chief Accountability Officer (Philadelphia) provide her with deep knowledge of successful strategies and potential barriers to achieving widespread district reform. Dr. Michael Webb, Associate VP, will direct JFF’s documentation and peer learning services to the SECEP districts, and provide district and school design technical assistance. Dr. Webb has led JFF’s Early College High School Initiative capacity-building work, including managing the initiative’s Student Information System, and he previously led small schools development in NYC as VP of New Visions for Public Schools.

At MCNC: Dr. Cecilia Cunningham, who will lead MCNC’s professional development services, is the founder and Director of the MCNC. She was principal of the original Middle College at LaGuardia Community College, and co-directed the replication of this model and led the pioneering efforts develop it as an Early College High School focusing on underserved populations. Middle College High School, under Dr. Cunningham’s leadership was the first public Early College High School to work with underserved students, and today, the MCNC has
35 member schools. **Dr. Chery Wagonlander** will direct MCNC’s design and PD services in Michigan and brings over 30 years experience as an educator, including as founding principal of a Middle College and a national model dropout prevention K-14 collaborative, and as director of Mott Community College’s technical assistance center to Middle and Early Colleges in MI.

The superintendents at each of the partner districts also bring tremendous knowledge, expertise, and experience in district-level leadership and redesign. **Paul Vallas**, Superintendent in Bridgeport, was previously Superintendent for the Recovery School District of Louisiana (post-Katrina) and Chief Executive Officer for both the Philadelphia, PA and Chicago, IL public school systems. **Michael Koster** has served as the Delta-Schoolcraft ISD for over eight years, and has raised the college going and employment rate of graduates to 95 percent. In her 26 year career in education, **Linda Hagel** (Genesee ISD) has held numerous leadership positions including principal, curriculum director, and Superintendent, and received the Visionary Leadership Award from the MI Association of School Boards, which recognizes district leadership teams for effective governance and success at improving student achievement. **Steven Zott** (Lapeer County ISD) brings experience as a high school teacher, coach, athletic director, middle and high school assistant principal, and high school principal, and he is in his 21st year as a superintendent. **Scott Menzel** brings experience in both educational leadership and workforce development. Prior to becoming a superintendent 10 years ago, he served as the Executive Director of Central Michigan Works and as the county School-to-Work Coordinator.

**E. Quality of Project Evaluation**

**Overview.** The third-party evaluation of the STEM Early College Expansion Partnership (SECEP) will be led by SERVE Center at the University of North Carolina - Greensboro, who is currently conducting an IES-funded large-scale longitudinal experimental study of the impact of
the ECHS model. Through a high quality quasi-experimental study, the evaluation will assess the extent to which SECEP is having a positive impact on teacher and student outcomes associated with readiness for and success in the STEM college pathway. The evaluation will also collect detailed data to examine the level of implementation and to provide useful feedback to the SECEP partners. The evaluation’s research questions address both impact and implementation:

1. (Impact) To what extent does SECEP result in improved student outcomes, including increased college preparatory course-taking and success, increased interest in STEM, increased high school graduation rates, and increased STEM college credits earned while in high school?

2. (Implementation) What services have been provided to teachers and schools? What has been the perceived quality and benefit of those services?

3. (Implementation) To what extent are participating SECEP teachers incorporating the targeted STEM strategies into their classroom instruction?

4. (Implementation) To what extent have participating schools and districts implemented the design elements of an Early College?

Logic Model. SECEP is taking the core components and supports from the ECHS model—shown to have positive impacts (Edmunds, Bernstein, Unlu, Glennie, & Smith, 2013; Edmunds et al., 2012)—and applying them in 15 high schools and 19 middle schools. The logic model is articulated on page 9 and drives the project and evaluation design.

Impact Evaluation. Methodology: The impact evaluation will utilize a quasi-experimental approach in order to estimate the effects of SECEP over and above the outcomes that would be observed in the absence of the initiative.

Sample: The SECEP partners have identified a total of 34 secondary schools that they will serve
the entire five years of the i3 grant. In Connecticut, this includes 3 high schools and their 5 feeder middle schools; in Michigan, they will serve 12 high schools, and 14 feeder middle schools. The study will examine the impact of the program on all schools receiving services.

We hope to match each treatment school to an estimated 4-5 comparison schools, resulting in a sample of approximately 75 high schools and 87 middle schools. We will exclude from the comparison sample any schools that are receiving or have previously received similar services from JFF or MCNC. Where possible, the matching will be done within district. If not possible, then the matching will be done across districts. Schools will be matched first on a baseline year of the outcomes of interest, including percent of students in the school who are enrolled in college preparatory courses, percent receiving college credits while in high school, and cohort graduation rates. Schools will then be matched on demographic characteristics, including percentage minority, percentage low-income and percentage English Language Learners. We will follow guidance from the What Works Clearinghouse in establishing baseline equivalence on baseline outcomes and demographic characteristics.

The sample of 75 high schools in MI and CT will be sufficient to detect effect sizes of more than 0.20 standard deviations. Assumptions for both power analyses done in Optimal Design include a statistical significance level of .05, 80 percent power, 100 students per grade per school, an intra-class correlation of .20 (Xu & Nichols, May, 2010), and an estimate of $R^2=.60$ (Bloom, Richburg-Hayes, & Black, 2005; Xu & Nichols, May, 2010) explained by the pretest measure and baseline covariates. The sample of 87 middle schools will be sufficient to detect effects of .18 standard deviations. As this is a quasi-experimental design, attrition is not a concern. We will document, however, the extent to which any schools leave the program.

**Measures and Data Collection:** We will examine the student-level intermediate and selected
long outcomes identified in the logic model. Core student outcomes for the high school component of SECEP include:

*College preparatory coursetaking and success.* A main goal of the project is to increase students’ college readiness. A key part of this is enrolling and helping students succeed in courses required for college entrance. As a result, this study looks at the proportion of students taking and succeeding in a core set of STEM college preparatory courses. These courses may differ slightly by state but will reflect the courses required by the state’s university entrance requirements.

*Taking and succeeding in STEM dual-credit courses.* A key goal is to increase the number of students having access to STEM college-credit bearing courses while in high school. We will examine the proportion of students who take and pass dual credit courses in STEM fields.

*Student interest in STEM careers.* A key goal of the project is to increase the percentage of students who are interested in STEM careers. We will use a survey to examine students’ attitudes toward STEM careers.

*High school graduation rates.* The intervention is designed to increase the number of students who are graduating from high school. If feasible within the evaluation’s time frame, the study will examine the impact of the model on the number of students graduating on time.

Core outcomes for the middle school component of the intervention include the following:

*8th grade academic performance.* The evaluation team will examine the impact of the model on the percentage of students who are passing the 8th grade math exams.

*Percent successfully completing Algebra I by the end of 9th grade.* The goal of the middle school intervention is to increase the percentage of students who are ready for college preparatory courses in 9th grade. As a result, the study will examine the impact of the model on the number of students who come from feeder middle schools and who have taken and successfully completed
Algebra I by the end of 9th grade.

High school- and middle school-level student data will be provided by the states or districts, as appropriate. We will collect core outcome data, student demographic characteristics, and baseline achievement data (from the year before entering the school receiving the intervention) that can be used as covariates in the analyses. We will obtain student-level data for the year prior to implementation of the SECEP program and for Years 3 and 4 of the intervention. We will collect original student-level data on attitudes and school experiences using a school survey that will be administered at baseline and in Year 3 of the intervention.

**Analyses:** Separate analyses will be conducted for the middle and the high schools. Our plan is to identify 4-5 comparison schools for each of the schools in each state (as described above). The primary analytic framework to be used to examine primary and secondary student outcomes of interest will be computing the standardized mean (for continuous outcomes) or odds ratio (for dichotomous outcomes) difference (Hedge’s g) between the intervention and control groups after 3 years of SECEP implementation, controlling for relevant baseline pre-test measures and covariates (including any baseline student outcomes that differ by more than .05 SDs between conditions). We will use HLM (hierarchical linear modeling) analyses (Raudenbush & Bryk, 2002) that account for the nesting of students within schools using appropriate SAS and STATA programs. HLM is the preferred method for analyzing data from studies with school-level assignment such as this one (Institute of Education Sciences, n.d., p. 45).

Given that we will be using extant data for most outcomes, we expect little in the way of missing data. However, for any missing data, we will not impute outcomes and we will not impute any covariates that are used to determine baseline equivalence. We will also conduct sub-group analyses to examine the impact of the program on populations of interest, particularly
those who are low-income, first-generation college-goers, members of underrepresented minority
groups, and those who are initially low-performing.

We recognize that the schools participating in this intervention were not randomly chosen
and, as such, may be differently motivated than schools that are not choosing to implement the
intervention and that will form our comparison group. We will attempt to mitigate this by
matching as closely as possible on the baseline outcomes of interest. Another potential threat to
internal validity is history, or the fact that external factors, such as state-level policy changes,
may be influencing the schools and causing any changes we see. We are attempting to mitigate
this threat by using a comparison group of schools in the same state or district (if possible) that
would likely be exposed to the same external factors. The fact that these schools are potentially
more motivated to participate in the intervention also forms a threat to external validity as it will
suggest that the results apply only to similarly motivated schools. During our site visits, we will
collect data on the reasons schools are participating in the intervention and on the attitudes of
schools toward the intervention. This may help us understand some of the characteristics that
schools need to implement the intervention and will inform the extent to which we can
generalize about the evaluation’s findings.

**Implementation Evaluation.** The evaluation will also measure program implementation and
analyze students’ experiences in the treatment and comparison schools. Aligned with the logic
model, the evaluation will examine three aspects of implementation, 1) the nature and quality of
the supports provided and 2) the extent to which SECEP educators are implementing the desired
strategies; and 3) the extent to which the intervention is being implemented as intended in
schools. All three of these aspects will be examined using a mixture of descriptive qualitative
and quantitative data.
To determine the nature and quality of supports provided, the evaluation will collect participation records from program staff to determine the level of school staff participation in the different program activities (i.e., professional development, coaching, etc.). Working with the SECEP partners, we will create threshold levels that represent adequate program implementation; we will then calculate indices for fidelity of implementation. The evaluation team will also conduct two observations per year of the technical assistance and professional development provided by the partners to the districts and schools. Once a year, staff in all participating schools will complete a survey that asks them to identify the activities in which they have participated and the quality and utility of those activities.

This annual survey will also be used to assess the extent to which the expansion schools are incorporating the Early College Design Elements, including the STEM-specific instructional strategies. SERVE Center’s current experimental study of the impact of early colleges has developed a survey to measure implementation, which will serve as the basis for the implementation survey for the i3 evaluation and will be adapted using indicators reflective of the key elements of the SECEP model. The survey will focus on:

*College Ready Academic Program.* The survey will include scales that measure: 1) level of implementation of the common instructional framework, 2) presence of a core curriculum that prepares students for college courses; and 3) use of rigorous and engaging instructional practices such as inquiry and problem-based learning. To assess whether SECEP staff are implementing the strategies they are being taught, we will include questions on this school-level survey that examine the level of implementation of specific, targeted instructional practices.

*College Headstart.* Survey scales will measure: 1) activities designed to expose students to college norms and behaviors; 2) student enrollment in STEM college courses.
**Wraparound Student Supports.** Survey scales will measure 1) type and frequency of academic support; 2) type and frequency of social supports; 3) explicit instruction in college behaviors; 4) provision of college advising and financial aid assistance.

**Organizational Practices.** The survey will include scales measuring the following school-level practices: 1) type and frequency of activities designed to build staff-student relationships; 2) quality of staff-student relationships; 3) college-going expectations; 4) professional development practices; 5) use of student data; and 6) frequency and nature of professional collaboration.

Staff at each comparison school will also be asked to complete a short survey focused on the design elements above. We will also ask questions concerning any other initiatives in which they are involved. This will allow us to determine the extent to which the core components of the model are already being implemented in the comparison schools.

To further assess teachers’ implementation of instructional strategies, we will supplement the survey by having SECEP teachers submit student assignments that they believe provide an example of the effective incorporation of the STEM-focused strategies. These assignments will be assessed using a rubric to determine the extent to which they represent high quality implementation of the STEM-focused strategies. The assignments will be collected at baseline and then at Years 2 and 3. Resources do not allow for the collection of assignments from comparison school teachers.

The evaluators will also visit 3 schools per state during each of the 2nd and 4th years. Program staff will identify schools and/or districts that appear to be making the most progress toward implementing the STEM ECHS design elements. If appropriate, we will choose sites that appear to be emphasizing implementation of different STEM design elements. For example, one site might have developed a comprehensive student support model while another might have
dramatically increased its enrollment in STEM college preparatory courses. During site visits, the research team will conduct interviews with district staff, school administrators, teachers, and students, and observe staff meetings, which will provide information on the implementation of the design elements and factors that support or hinder implementation of the model. Following the same schools over a three-year period will allow for detailed information about implementation. Resources do not allow for collecting site visit data on the comparison sites.

**Resources and Management.** The $1.2 million allocated for the evaluation will be sufficient to accomplish the tasks described in this plan. Dr. Julie Edmunds at the SERVE Center will lead the evaluation. Dr. Edmunds has been Principal Investigator for two IES grants for a longitudinal experimental study of the impact of the ECHS model in North Carolina. Dr. Edmunds is also leading the evaluation of two other i3 projects that also seek to implement the early college design in comprehensive high schools; as such she has an in-depth knowledge of both the design of the model, as well as the issues associated with measuring its impact and implementation. She will be able to use insights from these evaluations to inform the evaluation of SECEP. Dr. Laura Feagans Gould at the SERVE Center will serve as co-PI. Dr. Gould has spent the past 14 years conducting and applying research on at-risk youth to community and school-based programs that target social, emotional, and behavioral competencies of youth. She is a quantitative researcher by training with expertise in analytic frameworks relevant to longitudinal and nested data including, hierarchical linear modeling, growth curve modeling, structural equation and growth mixture modeling. Dr. Karla Lewis will serve as Project Manager, managing the day-to-day aspects, bringing extensive experience in interacting with state/district leadership. She was a Project Director with IES Regional Educational Laboratory Southeast and supervised the work of the SERVE Center State Liaisons (senior staff assigned to each southeast state).