Enrollment in nanotechnology-related programs at two-year colleges around the country is not large, yet the demand for technicians familiar with nanotechnology is growing. Part of the reason for this disparity may be due to students’ lack of exposure to nanotechnology in high school and two-year college curricula, which itself may arise from teachers’ and instructors’ own lack of exposure as to how nanotechnology relates to STEM classes. This proposal establishes SHINE, the Seattle Hub for Industry-driven Nanotechnology Education, to help address this lack of preparation in nanotechnology in our region. North Seattle Community College will expand the capacity of its current Nanotechnology program to undertake the promotion of nanotech education across the region—and at the same time—enhance the success of North Seattle Community College nanotechnology students by introducing several innovative and effective student engagement initiatives into our program.

**Intellectual Merit:** The SHINE project spans two ATE Project Activity areas: Program Improvement and Professional Development for Educators. Our project draws significantly on work from other NSF-funded activities, such as various Nanotechnology education modules, collaborative NanoDays events, and student-engagement techniques used by the Science and Technology Center on Materials and Devices for Information Technology Research (CMDITR). Professional development for educators will be offered through regional Train the NanoTrainer workshops each summer of the grant. These events are designed to provide high school and community college STEM instructors with an introduction to nanotechnology and its pedagogy, hands-on practice using and developing Nano modules, and guidance on how to build connections with local nanotechnology industries. Over the course of the following academic year, participating instructors will use and assess the classroom-level effectiveness of their developed materials and provide impact data to the SHINE project for national dissemination.

Program Improvement activities are designed to meet two inherently related goals: (1) the development of an active nanotechnology outreach network, reaching classrooms, after-school programs and informal-learning events across the greater-Seattle area; and, (2) increased and diversified student enrollment and graduation rates within the North Seattle Community College nanotechnology program. With the introduction of SHINE’s outreach and student engagement programs, we commit to increasing our small but steady enrollment by 60% over three years and increasing program diversity and graduation rates by more than double. The anticipated number of participants in direct outreach activities exceeds 1,200 students and 75 STEM educators over the life of the grant.

A number of ATE best-practice student engagement techniques such as college student outreach to high school youth, [our NanoAmbassador program](#), industry mentors and work-based experiences are supported through SHINE to increase student success in either the two-year Nanotechnology Associates of Applied Science Degree or one-year Certificate program. Outreach activities in the community will target middle and high school students, with a commitment to partnering with schools serving large numbers of students who are underrepresented in STEM professions (for example, Seattle Public Schools’ Latino Achievers; Seattle Girls’ Schools and the YMCA Black Achievers Program). Beyond formal learning environments, SHINE will contribute nanotechnology materials and student and faculty expertise to improve an annual two-week long NSF-NISEnet NanoDays program at KidsQuest Childrens’ Museum in Bellevue, WA.

**Broader Impacts:** By nature of the model, Train the NanoTrainer workshops will have a cascading effect across the region, reaching students of trained educators for potentially years to come. All outreach, instruction and student engagement materials developed through SHINE will be disseminated via our website (hosted by the NSF-ATE National Center at Penn State University).

Strong support for this project is shown by North Seattle Community College administrators, other educational institutions (middle and high schools, two and four-year colleges and universities), regional nanotech companies, the Washington Technology Industry Association, and the State Board for Community and Technical Colleges. Ultimately, the broad partnerships and activities supported through SHINE promote the creation of a diverse community in which interest in nanotechnology is nurtured and the education and employment paths related to nanotechnology are increasingly pursued by students in our region.