



**Pennsylvania  
College of Technology**  
A Penn State Affiliate

## ***A Collaborative Approach to Expanding Nondestructive Testing Education Within a Welding Program***

Year One Evaluation Report – March 2021

National Science Foundation ATE Award Number 2000831

Prepared by Blake Urbach  
Preferred Program Evaluations  
3043 Carmello Ave.  
Orlando, FL 32814  
(407) 375-2289  
[Blake@ppeonline.net](mailto:Blake@ppeonline.net)  
[www.ppeonline.net](http://www.ppeonline.net)



**PREFERRED PROGRAM  
EVALUATIONS**  
"Unlocking Program Potential"

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List of Acronyms and Initialisms

*20NDT – A Collaborative Approach to Expanding Nondestructive Testing Education  
Within a Welding Program*

A.A.S. – Associate of Applied Science

ABET – Accreditation Board for Engineering & Technology

ASNT – American Society for Nondestructive Testing

NDT – Nondestructive testing

NWI – National Welding Institute

PAUT – Phased Array Ultrasonic Testing

PCT – Pennsylvania College of Technology

PRM – Public Relations and Marketing

RT – Radiographic testing

UT – Ultrasonic testing

## EXECUTIVE SUMMARY

The findings, recommendations, and commendations that comprise this first annual evaluation report are based on grant-related activities and accomplishments occurring between May 2020 and March 2021. The goals, objectives, and working framework of Pennsylvania College of Technology's (PCT's) "A Collaborative Approach to Expanding Nondestructive Testing Education Within a Welding Program" (herein after referred to as *20NDT*) are detailed herein.

This project is being implemented under the leadership of Mr. Michael Nau, P.I., and two Co-P.I.s, Dr. Bradley Webb and Mr. James Colton. The project team is committed to the success of this initiative, and all stakeholders expressed confidence that the buy-in of the college's administration has been secured. The college has entered into a three-year partnership with the Naval Welding Institute (NWI). Beginning in September 2020, Mr. Kris Jones, Founder and CEO of NWI, brought in six Level III NDT professionals to help develop the curriculum for the new academic credentials in accordance with American Society for Nondestructive Testing (ASNT) requirements.

A total of eight new NDT courses have been developed and subsequently granted approval from the college's curriculum committee. The radiographic testing (RT) and ultrasonic testing (UT) competency credentials were officially approved by the college in spring 2021 and will be offered to students beginning in fall 2021. As of late spring 2021, the RT and UT competency credentials are slated to become part of the college's digital program catalogue.

The RT competency credential requires a total of five courses (including a radiation safety course) and 15 credit hours. The UT competency credential requires a total of four courses and 13 credit hours. While the theory component of the curriculum under development is agnostic, the application is specific to the equipment the students are likely to encounter in the workplace.

These competency credentials are structured so that each one can be completed in two semesters. They are standalone academic programs expected to appeal to incumbent workers looking to upskill or reskill. At the time of this report, the expectation is for students to earn Level I ASNT certification upon completion of the competency credentials. The project team is considering the possibility of including one extra course in the sequence in order to reach the required number of hours for Level II ASNT certification.

In January 2021, NWI facilitated a two-hour train-the-trainer via Google Classroom for the college's NDT faculty and NWI representatives working on *20NDT*. The focus of the training was RT, and NWI tailored the training to the areas of interest expressed by NDT faculty.

Dr. Webb secured approval from PCT to create the NDT Industry Advisory Committee for the new academic credentials. The Industry Advisory Committee will be comprised of representatives who can inform the curriculum and co-curricular activities; provide internships for students, and possibly help place students upon graduation. The project team intends to invite five or six industry representatives to the first NDT Industry Advisory Committee meeting in spring 2021, and possibly invite up to four additional members to join the committee in the subsequent year.

A recent expansion at the college culminated in a 55,000-square-foot welding facility featuring a designated NDT classroom and lab. In year one of the grant, several significant equipment purchases were made in support of the new NDT academic programs. The college acquired seven Olympus phased array ultrasonic testing (PAUT) units, a digital x-ray bed, and a dummy radiographic source. An in-person training on the new PAUT units will be conducted by Olympus in late spring 2021. The NDT lab is expected to be fully outfitted in time for the first cohort of NDT students in fall 2021.

## PROJECT DESCRIPTION

In May 2020, PCT was awarded a three-year National Science Foundation Advanced Technological Education (NSF ATE) grant in the amount of \$599,816 to support *20NDT*. NDT positions are of critical importance to our nation's infrastructure. This project aims to address the growing unmet need for skilled technicians in NDT. PCT is already regarded as a leader in welding and NDT instruction, and this ATE grant will increase the institution's capacity to train traditional and non-traditional students to become NDT specialists. Other institutions offering a similar degree do not have a welding component in their NDT programs, and this distinction makes the academic credentials to be offered by PCT particularly unique.

As originally proposed, over the course of the project's first two years, *20NDT* would develop a new A.A.S. degree program and two specialized certificate programs in NDT. The project's objectives include: 1) develop curricula for RT and UT certificates that lead to fulfillment of ASNT Level II classroom requirements; 2) align the two certificates and the A.A.S. degree program to create flexible academic pathways for students; 3) enhance student learning with new equipment for teaching RT and UT, and 4) recruit and enroll high school students and incumbent workers in new pathways to earning NDT credentials.

This project will be supported by a comprehensive evaluation designed to assess the significance of the initiative on the advancement of student engagement, scholarship, and workforce readiness in NDT, and the capacity-building of the college and its community stakeholders.

## METHODOLOGY

The external evaluation of *20NDT* is intended to satisfy NSF ATE's requirement that all funded projects conduct a thorough assessment of their activities and outcomes. The evaluation is being led by Blake Urbach, Principal Consultant of Preferred Program Evaluations. The evaluator is prepared to draw from a combination of qualitative and quantitative data sources that will provide an in-depth examination of the project implementation and management processes, and inform mid-course correction throughout the performance period. These include: project records, artifacts, and activity logs; curriculum/frameworks; institutional records of enrollment, performance, and completion; one-on-one interviews with a cross-section of internal and external stakeholders; student focus groups; site visits to PCT, and a series of surveys for students, summer camp participants, faculty, and industry partners.

The evaluation will aid PCT in measuring the impact – both projected and unanticipated – on: 1) designing and adopting an industry-approved curriculum featuring NDT; 2) determining effective practices that promote and reinforce student success in the new degree and/or certificate programs; 3) assessing the fidelity of project activities and processes; 4) identifying constraints encountered that may pose threats to validity within the implementation process; and, 5) reviewing evidence of change among participating students. The evaluation will also assess methods of recruitment and service delivery, characteristics of participants served, growth in faculty confidence and competencies, collaboration with industry partners, and changes in organizational capacity.

Ongoing assessment of the project will include routine correspondence, monthly meetings, ad-hoc monitoring, presentations, and annual evaluation reports. Strategies employed during the performance period that are shown to have favorable student and faculty outcomes will inform subsequent changes in pedagogy and practice. Findings will be reviewed with the project team and shared with the NDT Industry Advisory Committee, and the parties will strategize the most effective ways to address identified challenges to meeting the objectives *20NDT*.

The external evaluator's duties and responsibilities include evaluation oversight, alignment of data to project goals, and meaningful reporting on program impact. Using a holistic evaluation design, the evaluator will present a current and complete picture of the project as it takes shape over the three-year performance period. The evaluation is being guided by a series of questions about participants, process, correction, and impact.

Evaluation Questions	
<u>Participants:</u>	Are incoming students and incumbent workers enrolling in the degree and/or certificate programs on par with project outcomes? How have high school students been made aware of the summer camp and dual enrollment opportunities? Are faculty satisfactorily completing train-the-trainer modules?
<u>Process:</u>	In what ways is the project contributing to student engagement in NDT? How has the input of industry partners been used to shape/revise the new curriculum? How have teachers modified their instruction to incorporate NDT simulations using the new equipment?
<u>Correction:</u>	What adjustments were necessary for the promotion of the new program offerings? What corrective actions were taken to ensure students have the requisite knowledge and skills to pass the Level I and II ASNT practice exams?
<u>Impact:</u>	To what extent did the degree and certificate programs produce graduates prepared for employment as NDT technicians? How has the institution's capacity grown as a result of the new program offerings? In what ways have the external stakeholders contributed to the sustainability of this initiative post-funding?

In fall 2020 and spring 2021, one-on-one stakeholder interviews were conducted by the project's external evaluator. Stakeholder interviews are valued for generating a candid, in-depth dialogue about project implementation and management processes unobtainable through traditional surveying methods. Participants were asked to respond to a set of questions about planning, activities, and collaboration taking place during the first year of 20NDT's implementation. The evaluator spoke with a total of four 20NDT stakeholders from PCT and NWI (the PCT project team members were interviewed twice).

- Dr. Bradley Webb – Co-P.I., and Dean, School of Engineering Technologies, Pennsylvania College of Technology
- Mr. Michael Nau – P.I., and Welding Instructor, Pennsylvania College of Technology
- Mr. James Colton – Co-P.I., and Assistant Professor of Welding, Pennsylvania College of Technology
- Mr. Kris Jones – Founder and CEO, Naval Welding Institute

**PROJECT OBJECTIVES AND OUTCOMES MATRIX**

<b>Goals and Objectives</b>	<b>Measures (frequency of collection)</b>	<b>Data Sources</b>
<p><b><i>Develop AAS/certificates in NDT</i></b></p> <ul style="list-style-type: none"> <li>• Fully develop 80 hours for certification in RT and UT</li> <li>➔ Eight NDT courses totaling 26 credit hours have been developed and approved</li> <li>• Fully develop courses for PAUT</li> <li>➔ RT and UT courses will be offered beginning in fall 2021</li> <li>• Acquire equipment for RT and PAUT</li> <li>➔ 7 PAUT units, a digital x-ray bed, and a dummy radiographic source have been purchased for the NDT lab</li> <li>• Create pathways from certificates to AAS to BS</li> </ul>	<ul style="list-style-type: none"> <li>• Number of new NDT courses leading to AAS and certificates (annual)</li> <li>• Pathways in place to share credits between certificate, AAS, and BS programs (annual)</li> </ul>	<ul style="list-style-type: none"> <li>• Document review</li> <li>• Curriculum/frameworks</li> <li>• Institutional records</li> <li>• Stakeholder interviews</li> <li>• Focus groups</li> </ul>
<p><b><i>Recruit students into the NDT AAS and certificate programs and place graduates in industry positions</i></b></p> <ul style="list-style-type: none"> <li>• 10 students enroll annually in AAS</li> <li>• 5 students enroll in each certificate program.</li> <li>• 90% of completers are placed in an NDT position</li> </ul>	<ul style="list-style-type: none"> <li>• #, %, demographics of students applying for and enrolling in the AAS and certificate programs (semester)</li> <li>• #, % who complete the program requirements and who pass the Level I and II ASNT practice exams (semester)</li> <li>• #, % program completers who secure employment in an NDT field (semester)</li> <li>• #, %, demographics of summer camp, Philadelphia summer event, and PCNOW participants who enroll in Penn College’s NDT programs (annual)</li> </ul>	<ul style="list-style-type: none"> <li>• Project records and activity logs</li> <li>• Recruitment event participation</li> <li>• Institutional records</li> <li>• Stakeholder interviews</li> <li>• Student surveys</li> <li>• Focus groups</li> </ul>
<p><b><i>Provide faculty with train-the-trainer opportunities to improve their NDT knowledge</i></b></p> <ul style="list-style-type: none"> <li>➔ NWI facilitated a virtual training on RT in Jan. 2021</li> </ul>	<ul style="list-style-type: none"> <li>• Faculty ability to teach the NDT curriculum and use equipment (annual)</li> </ul>	<ul style="list-style-type: none"> <li>• Project records and activity logs</li> <li>• Stakeholder interviews</li> <li>• Faculty surveys</li> </ul>
<p><b><i>Disseminate curriculum, lessons learned, instructional best</i></b></p>	<ul style="list-style-type: none"> <li>• Dissemination of project results (annual)</li> </ul>	<ul style="list-style-type: none"> <li>• Publication and presentation of materials</li> </ul>

## FINDINGS AND RECOMMENDATIONS

### Project Administration and Leadership

In his role as Dean, School of Engineering Technologies, Dr. Webb helps coordinate and oversee academic programs. Dr. Webb is the fiscal agent of this ATE grant, and approves all expenditures related to *20NDT*. He is also responsible for keeping the project team's activities in sync with the implementation timeline, and building relationships with business and industry.

Mr. Nau and Mr. Colton serve as the lead faculty of PCT's welding department. For this ATE grant, they are tasked with course abstract and outcomes development, course sequencing, and recruiting representatives for the NDT Industry Advisory Committee. Mr. Colton indicated that the project team is proactively structuring the new NDT courses so they seamlessly roll into A.A.S. degree program under development. These project team members are working closely with NWI to draft the UT and RT competency credentials, assessments, and labs.

In fall 2020, a new faculty member, Mr. Mark Hurd, was hired to assist with teaching the NDT courses developed as part of this grant. Mr. Hurd specializes in NDT and is presently a UT and RT Level II technician. The NDT faculty will double as the students' academic advisors and faculty liaisons during internships.

The interviewees acknowledged that the expectations regarding roles and responsibilities were clearly communicated. The project team is committed to the success of this initiative, and all stakeholders expressed confidence that the buy-in of the college's administration has been secured. Year one of this project was described as the "creation year" of *20NDT*, during which relationships are being forged and the curriculum is being written.

Dr. Webb noted there was some unexpected downtime in the summer months, largely as a result of the project team members managing pressing needs brought about by COVID-19. According to Dr. Webb, we are "working differently than we have in the past." He estimated that during the fall 2020 term, 30% of daily work-related tasks involve putting out time-sensitive COVID-19-related disruptions.

COVID-19 necessitated the migration to a fully virtual meeting environment. All project team meetings involving NWI have been held via Zoom. Mr. Colton explained that it is typical for a partner of the college to be invited to campus for a tour of the facility. In light of the current circumstances, all campus visits of this nature have been postponed until further notice.

When asked how COVID-19 has influenced the development of *20NDT*, the interviewees noted that it grounded recruiting activities, postponed high school instructor trainings, and deferred efforts to drum up interest in the program offerings and create a pipeline of interested students. The impact of COVID-19 has also been significant with regard to the project team's inability to travel and have guests visit the campus. Several interviewees mentioned their desire to visit NWI in person, visit the facilities of other educational institutions with existing NDT degree programs, and participate in professional conferences. Per Mr. Nau, the NDT faculty typically attend the ASNT annual conference but were unable to do so in 2020. This conference was identified as a prime event for making new contacts with academics and practitioners in the industry; learning about equipment, software, and platforms, and becoming informed about opportunities for current students and job placement opportunities for recent graduates.

## Industry Collaboration

Several interviewees indicated there is not a wealth of curricular materials on NDT in the higher education space. To ensure the development of a rigorous and relevant industry-driven curriculum for the new NDT academic credentials, the college has entered into a three-year partnership with NWI. NWI is a contracted expert tasked with purposely aligning the core curriculum with ASNT requirements.

Beginning in September 2020, NWI brought in six Level III NDT professionals to help develop the curriculum for the new academic credentials at PCT. Per Mr. Jones, the curriculum development in year one of *20NDT* is a multi-step process: a curriculum package is provided for review, PCT provides feedback on the content and design, and then a final product is delivered for the college's use. PCT and NWI are generating a shared understanding of curriculum frameworks from an industry perspective. NWI is prepared to provide novel, intensive training on ASNT standards throughout its partnership with PCT. In year two of this ATE grant, revisions will be made to the curriculum, as necessary.

In January 2021, NWI facilitated a two-hour train-the-trainer via Google Classroom for the college's NDT faculty and NWI representatives working on *20NDT*. The focus of the training was RT, and NWI tailored the training to the areas of interest expressed by the NDT faculty members. For example, Mr. Nau noted that the faculty requested to review the mathematical formula to calculate shot times, and this topic was covered at length during January's training. The training was described by the interviewees as "valuable," and successfully achieved its

objective. In year two of 20NDT, NWI is expected to facilitate a training on phased array technology. Ideally, the next training(s) facilitated by NWI will be face-to-face.

Mr. Jones was pleased to report that the college has been very responsive, and that the expectations of NWI have been clearly delineated. Weekly team meetings and ongoing correspondence related to anticipated touchpoints of project milestones have met the needs of NWI and fostered a productive partnership.

The project team is also collaborating with WELD-ED, an ATE national center. Dr. Webb secured approval from PCT to create the NDT Industry Advisory Committee for the new academic credentials. The Industry Advisory Committee will be comprised of representatives who can inform the curriculum and co-curricular activities; provide internships for students, and possibly help place students upon graduation. NDT students and alumni of PCT's welding program will also be asked to sit on the committee to offer the student/graduate perspective. Mr. Jones communicated that he is actively identifying individuals in the "ship manufacturing sector" to serve on the NDT Industry Advisory Committee.

The project team intends to invite five or six industry representatives to the first NDT Industry Advisory Committee meeting in spring 2021, and possibly invite up to four additional members to join the committee in the subsequent year. Mr. Nau mentioned that as a result of COVID-19 and the transition to fully virtual meetings as the norm, the project team elected to expand its pool to include industry representatives nationwide. In order to uncover the ways in which the committee members envision their participation in the college's new NDT academic programs, the external evaluator designed an industry partner survey to be administered in spring 2021. The survey findings are expected to yield a better understanding of which representatives (companies) are interested in being involved as guest speakers, presenters at a symposium, experiential learning partners, etc.

## NDT Program Offerings

The RT and UT competency credentials (and corresponding curricula) were officially approved by the college in spring 2021, and will be offered to students beginning in fall 2021. As of late spring 2021, the RT and UT competency credentials are slated to become part of the college's digital program catalogue. These competency credentials are structured so that each one can be completed in two semesters. They are standalone academic programs expected to appeal to incumbent workers looking to upskill or reskill. Per Dr. Webb, competency credentials

have some limitations for financial aid monies. It will be important to communicate these stipulations to prospective students from the outset to ensure they have sufficient funds to complete their program of study.

The RT competency credential requires a total of five courses (including a radiation safety course) and 15 credit hours. The UT competency credential requires a total of four courses and 13 credit hours. A total of eight new NDT courses have been developed and subsequently granted approval from the college’s curriculum committee. Each of these courses will be offered in eight-week terms, and the instruction will be delivered face-to-face (unless COVID-19 restrictions necessitate virtual instruction). In the event the new RT and UT courses have low enrollment, the P.I. will secure permission from college administration to run these courses with low enrollment.

RT Competency Credential - New Courses	UT Competency Credential - New Courses
QAL 102 Radiation Safety	QAL 103 Governing Technical Documents for NDT
QAL 103 Governing Technical Documents for NDT	QAL 124 Ultrasonic Testing I
QAL 122 Radiographic Testing I	QAL 126 Ultrasonic Inspection & Recording Practices
QAL 123 Radiographic Inspection & Recording Practices	QAL 224 Ultrasonic Testing II
QAL 222 Radiographic Testing II	

Mr. Jones remarked that with some improvements to the design, the radiation safety course could be spun off into its own certificate. He called attention to the skills gap in the NDT workforce, and the current employment projections that 50,000-100,000 NDT positions will go unfilled. The interviewees shared that much of the NDT work to be performed is contracted. There is, however, a great demand for employees in both the public and private sectors who can perform this work in-house. *20NDT* represents a unique opportunity to build a pipeline of graduates with the theoretical knowledge and technical skills to succeed in the field. As *20NDT* evolves over its three-year performance period, it has the potential to serve as a model for career and educational pathways in NDT worthy of replication or expansion at other colleges.

The RT and UT competency credentials are expected to be embedded within the A.A.S. degree program. Thus, students who complete the A.A.S. degree will have earned both of these competency credentials as well. The project team decided to pursue the route of RT and UT competency credentials in lieu of “certificate” because it has fewer general education requirements that must be met.

In year two of the grant, the project team will begin drafting the A.A.S. degree curriculum, labs, and assessments in conjunction with NWI. The curriculum is being developed in accordance with ASNT standards. The project team is confident that the Industry Advisory Committee will agree that this is the preferred approach to creating content that best serves future NDT practitioners.

Mr. Nau indicated that the A.A.S. curriculum will focus on discontinuity, defects, and processes of NDT. The project team researched other institutions' NDT academic programs and shared the relevant content with NWI. Other institutions offering a similar degree program do not have a welding component in their NDT programs, and this distinction makes the academic credentials to be offered by PCT particularly unique. As *20NDT* progresses, there may be value in having NDT Industry Advisory Committee members record "expert content" that can be used as supplementary instructional material in the degree program's core courses.

Per Dr. Webb, the goal is for students to earn Level I ASNT certification upon completion of the competency credentials. At the time of this report, the project team was considering the possibility of including one extra course in the sequence in order to reach the required number of hours for Level II ASNT certification. The college has several certified welding inspectors on staff but only one, Mr. Hurd, is ASNT certified. Each level of ASNT certification requires a robust number of classroom and lab hours, and these hours must be certified by a Level III examiner. NWI has the ability to certify the NDT students' hours, and in the final year of *20NDT*, the intention is to have at least 10 students achieve ASNT certification with NWI's oversight.

## Marketing and Recruiting

Dr. Webb shared that it can be difficult to generate interest and enroll students in a brand-new academic program in the best of times. The limitations on marketing and recruiting resulting from COVID-19 will make the project team's efforts even more challenging. For marketing and recruiting purposes, the project team is encouraged to highlight the experiential aspects of the program curriculum and the lucrative career prospects in the region and nationwide for NDT specialists.

The college's newest ATE grant award was first announced in May 2020 via an article on *PC Today* (<https://pctoday.pct.edu/nsf-supporting-program-development-at-penn-college/>). (See

Appendix). Additionally, the project team was able to spotlight *20NDT* during the (virtual) 27<sup>th</sup> National ATE PI Conference in October 2020 (see Appendix).

In spring 2021, the project team intends to issue a press release about the RT and UT competency credentials to all local newspapers. Also in spring 2021, the project team will request the assistance of Public Relations and Marketing (PRM) on all print and digital marketing activities for the new program offerings. PRM will work with college admissions to design a drip marketing email campaign. Additional marketing efforts will include targeted advertisements on digital platforms, outreach to companies in the region, and a *20NDT* project website. This will be a collaborative effort insofar as NDT faculty members have the contact list of companies, institutions, and organizations that should receive these materials.

The welding department has been kept informed of the progress of the new NDT program offerings, and several welding students have already expressed interest in pursuing the RT and/or UT competency credentials. Dr. Webb remarked that the project team is also conversing with the college's aviation technology dean to promote the NDT program offerings among students in this program. Other outlets for consideration in year two of *20NDT* are high school career fairs, high school STEM clubs, and veterans and community events.

In year two of the grant, the project team is prepared to move forward with Penn College Now, the college's dual enrollment initiative. The intention is to build NDT units into the welding equipment at area high schools, and begin to generate a pipeline of students interested in studying NDT.

## Value Added for Students and the College

When asked how this ATE grant will contribute to STEM student experiences and success, the stakeholders were in consensus that *20NDT* will provide specialized academic and real-world learning opportunities not currently available at the college. Mr. Colton emphasized that while other schools have an NDT emphasis, the new programs at PCT will be NDT exclusive. Mr. Nau accentuated that the welding of today is technologically advanced. Students of these programs will have practical experience with the equipment (of several manufacturers) and be very competitive as they enter the job market.

The college has a robust internship process in place. Currently, there are over 100 PCT welding students completing an internship (which requires 225-300 contact hours). At the time of

this report, a determination had been made not to include an internship as a requirement for the A.A.S. degree in NDT because it is unfeasible to place all of the students. The project team will, however, highly recommend internships as beneficial co-curricular engagements, and intends to leverage business and industry partnerships for (paid and unpaid) NDT internships. The project team will likely structure the internship for NDT students after the college's existing model for welding students.

Per Dr. Webb, it will be important to determine the value that employers place on hiring graduates with Level I certification. Furthermore, will companies be willing to provide internships to help students accrue additional hours for ASNT Level II certification? If so, this has the potential to heighten the value of the degree program and make it even more attractive to incoming students and incumbent workers.

With respect to how 20NDT will benefit the college, the new academic programs are expected to attract FTICs and practitioners looking to upskill and reskill. 20NDT will "take our welding program to the next level." The college is already regarded as a leader in welding and NDT instruction, and this ATE grant will increase the institution's capacity to train traditional and non-traditional students.

A recent expansion at the college culminated in a 55,000-square-foot welding facility featuring a designated NDT classroom and lab. PCT is the only institution in the nation with an electron beam welder. Mr. Jones is of the opinion that the infrastructure of PCT's lab should be sufficient to support the new NDT academic programs. PCT did not work with NWI to develop a buy-list, nor did NWI have a role in coordinating the purchase of equipment and other lab upgrades.

In year one of the grant, several significant equipment purchases were made in support of the new NDT academic programs. The college acquired seven Olympus PAUT units for a combined cost of \$121,000. (The college has two of these units and a mag particle machine in its existing lab). Mr. Colton noted that the project team is overseeing the building of a few storage cabinets to securely house the new equipment.

The college also purchased a digital x-ray bed for \$52,000 and a dummy radiographic source for \$5,000. These items were originally planned for purchase in year two of the grant, but the P.I. elected to buy them early given the rising costs of equipment and consumables. Dr. Webb shared that there is a shortage of raw materials available because foundries shut down during the pandemic. Both domestic and foreign production of commodities has slowed, and steel, for instance, has nearly doubled in price.

An in-person training on the new PAUT units will be conducted by Olympus in late spring 2021. The offer to attend this hands-on training has been extended to all PCT NDT and welding faculty, and NWI representatives. Olympus will provide the college with ongoing technical support for its new equipment.

The NDT lab can accommodate up to 16 students per class section. There is a total of eight PAUT units available for students (working in pairs), and one demo unit for the faculty member. At the time of this report, the project team was awaiting clarification from ASNT as to whether the students can be paired or if they must be solo on the equipment in order to earn classroom training hours. This decision by ASNT will determine how many students can be served per semester.

Mr. Colton shared that the college anticipates seeking ABET accreditation for its welding program, and will likely commit to having its NDT program accredited as well. In order to meet the requirements for accreditation, the college may need to create additional content and assessments that align with the defined standards of quality set forth by ABET.



<https://pctoday.pct.edu/nsf-supporting-program-development-at-penn-college/>

NSF supporting program development at Penn College

MAY 20, 2020 [ENGINEERING TECHNOLOGIES](#), [WELDING](#)

A three-year National Science Foundation grant is supporting Pennsylvania College of Technology's development of two certificates and an associate degree to meet the growing need for technicians in non-destructive testing.

The nearly \$600,000 grant – A Collaborative Approach to Expanding Nondestructive Testing Education Within a Welding Program – is funded by the NSF's Advanced Technological Education program, which is geared to the education of technicians for advanced-technology fields that drive the nation's economy, such as non-destructive testing.

Non-destructive testing employs various technologies – including ultrasound and X-ray analysis – to test the safety of structures, vehicles or vessels. Technicians help prevent injury or loss of life by ensuring that infrastructure industries meet quality and safety assurance requirements.

“There is both a high demand for non-destructive testing and a shortage of training programs,” said Bradley M. Webb, dean of industrial, computing and engineering technologies. “We believe our initiatives will successfully address both of those issues.”

Those initiatives include two stand-alone certificates in non-destructive testing methods (radiography and ultrasound). Both of the short-term programs are being built to comply with American Society for Non-Destructive Testing Level II certification.

The college is also developing an associate degree in non-destructive testing and welding.

“Our review of NDT programs across the country didn't show any with an in-depth examination and understanding of the science or process of welding,” Webb said. “Our degree will combine a year of welding instruction with a year focusing on non-destructive testing. Penn College will be offering a unique approach for educating new NDT examiners.”

The college's 55,000-square-foot welding facility – believed to be the largest in U.S. higher education – includes a non-destructive testing lab with advanced technology.

Thanks to the grant, it's anticipated that the certificate programs will be offered for the 2021-22 Academic Year, followed a year later by the associate degree.

Webb and James N. Colton II, assistant professor of welding, assisted with the grant application. Michael J. Nau, instructor of welding, serves as the grant's principal investigator.

For information on degrees and certificates offered by the [School of Engineering Technologies](#), call 570-327-4520.

For more about grant-funding opportunities, faculty and staff may contact Grants & Sponsored Programs at ext. 7580 or through its Web portal.

[Penn College](#) is a national leader in applied technology education. Email the [Admissions Office](#) or call toll-free at 800-367-9222.

## Appendix B – 20NDT Spotlight from 27<sup>th</sup> Annual ATE PI Conference



### A Collaborative Approach to Expanding Nondestructive Testing Education within a Welding Program ATE Summary | 2020

#### BACKGROUND

This project aims to meet the growing need for skilled non-destructive testing technicians in industry by: 1) developing short-term certificates in radiographic testing (RT) and ultrasonic testing (UT) methods; 2) developing a new A.A.S. that includes a strong welding foundation combined with RT and UT methods; 3) acquiring technology to teach and practice digital RT methods; and 4) ensuring all coursework meets the American Society for Non-destructive Testing requirements, which will enable graduates to earn industry recognized credentials.

#### FUNDER:

National Science Foundation  
Advanced Technological Education Program

#### TIMEFRAME:

2010-2023

#### AWARD:

\$599,816

#### EQUIPMENT PURCHASE:

Logos MÓNOS Flat Panel System – A 17" x 14" high resolution imaging system. As opposed to film systems, digital RT systems have built in measuring tools, the ability to zoom in on discontinuities, and the capacity to capture images of materials that traditional film methods cannot. This system will enable students to prepare, shoot (expose), and inspect many more samples during a standard lab section.

#### PARTNERSHIP:

The Naval Welding Institute will assist in developing coursework that meets ASNT certification requirements. Additionally, they will help develop written procedures for inspections of plate, pipe, and complex geometries, confirm all exams meet ASNT standards, and perform inspections on samples to confirm student practical assessments.

#### ACADEMIC YEAR 2020/2021 Plans:

- RT course/program development
- UT course/program development
- Developing an NDT advisory committee
- Acquiring a dummy radiographic source

PI: Mike Nau - [mnau@pct.edu](mailto:mnau@pct.edu) | Co-PI: Brad Webb - [bwebb@pct.edu](mailto:bwebb@pct.edu) | Co-PI: Jim Colton - [icolton@pct.edu](mailto:icolton@pct.edu)



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