



**YEAR 1 – Annual Evaluation Report for Parkland College  
Precision Agriculture  
Curriculum Enhancement  
(PACE) Project  
Parkland College, IL  
NSF ATE DUE# 1601473**

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Principal Project Investigator: Jennifer Fridgen  
Co-Principal Project Investigator: Amanda Briggs

Dr. Mike Rudibaugh, SCATE Inc. Evaluator

## **Project Summary**

The goal of the Precision Agriculture Curriculum Enhancement (PACE) project is to prepare precision agriculture technicians and program graduates for expanding job opportunities in agricultural active areas of the Midwest. This process is being engaged through current program modification and enhancements, better career awareness by leveraging partnerships with regional high school agriculture programs, and improved articulation models with regional and state universities to create career pathways for precision agriculture program graduates from Parkland College. The process and partnerships being tested are to serve as a potential national model for other schools looking to expand and grow viable career pathways for the precision agriculture industry. Long term goals could result in resources and models leading to an educational approach that can be adopted by other institutions nationwide exploring how best to grow a viable precision agricultural program linking high schools, community college, universities, and industries together as a career pathway.

Year 1 project goals focus on developing and updating curriculum (courses) within Parkland's current precision agriculture program. This focus was driven primarily by strong evidence and recommendations from Parkland's Precision Agriculture Advisory Board, marketing, recruiting students, identifying STEM classes for incorporation of GST concepts, identifying high schools for delivery of college credit GSTE 101 courses, professional development opportunities for SCATE Inc.

faculty and community, identifying internship sites, development of feedback surveys, and development of Advisory Board membership.

## **Year 1 Project Goals**

**Goal 1:** Improve and expand precision agricultural education for two year colleges.

- Associated deliverable: Creation of new course (Precision Agriculture Systems Hardware).
- Associated deliverable: Modify and update two existing courses in current program (Precision Data Analytics AGB 252 and Remote Sensing GIS115).
- Associated deliverable: Verify curriculum and certificate changes meet industry standards through Precision Agriculture Advisory Board feedback.

**Goal 2:** Improve and expand precision agriculture education opportunities at area high schools.

- Associated deliverable: The first year will produce a new dual -credit course, Introduction to Precision Agriculture, to local high school partners as a dual enrollment opportunity.
- Associated deliverable: Parkland College will host an annual conference for high school faculty targeting emerging technologies in agriculture as both professional development and outreach marketing to improve career awareness opportunities in precision agriculture.
- Associated deliverable: Improved high school outreach through a series of site visits to high schools, tours of Parkland's agriculture facilities, and the production of marketing materials to improve awareness to local high school faculty/students on precision agriculture program at Parkland.
- Associated deliverable: Increasing effort to target growing enrollments of females into Parkland's dual credit/enrollment class to target this historically underserved market in the precision agriculture industry.

**Goal 3:** Improve compatibility between two-year college and 4-year university precision agriculture curriculum within Precision Agriculture Programs and broader curricula.

- Associated deliverables: Update articulation agreements with Parkland and existing 4-Year state institutions relating to precision agriculture programs and curriculum.

## **Findings:**

**Goal 1: Improve and expand precision agricultural education for two year colleges.**

**Associated deliverables: 1) Creation of new course, Precision Agriculture Systems Hardware, to support the growing demand for technicians to support variable rate technology (VRT); and, 2) modify and enhance two existing courses in the program,**

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**Precision Data Analytics and Remote Sensing, to reflect new innovations and mapping technologies impacting agronomic field management issues for technicians.**

In Fall, 2016, the grant team proposed the creation of the new course, Precision and Agricultural Systems Hardware (AGB 219), and modifications to the two existing courses, Precision Data Analytics and Remote Sensing, for PCC's Curriculum Committee approval. All three courses were approved by PCC's Curriculum Committee. See Appendix, **Pages 8-16: New and Modified course approval sheets.**

In the Spring, 2017, 4 students registered for Precision Data Analytics course (AGB 252), and 12 students registered for the Remote Sensing (GIS115) course. The AGB 252 course is required for graduation, so the college allowed the course to be taught even though enrollment was low. The new course, Precision Hardware Systems (AGB219) is set to be offered for the first time in the Fall 2017 semester. See Appendix, **Page 3: Parkland Precision Agriculture Evaluation Framework.**

On January 9, 2017, The PCC Precision Agriculture Program Advisory Board met to discuss program modification and changes. Validating industry support was important in verifying local employer buy-in for program changes impacting courses/technologies. Post-meeting survey results indicate very strong support and buy-in from the Board. The following results indicates key survey outcomes verifying the Board's support relating to curriculum changes with the program and overall support for long term partnership for employing program graduates:

- Over 80% of the Board approved program changes;
- Over 80% of the Board stated they would be interested in hiring graduates from the program;
- Over 80% of the Board stated they would be interested in helping the program through providing guest speakers, help with recruitment visits, company endorsements on program website, and providing internship opportunities.

Please see Appendix, **Pages 18-21: Advisory Council Survey questions with response and feedback** for the full list of questions and individual responses.

These findings and sheets verify the grant team has reached year one goals relating to program modification and strong industry support to validate the changes. One new course was created within the program, and two courses were modified within PPC's Precision Agriculture Program with PCC Curriculum Council approval. In addition, program modification and course design/curriculum issues were supported by an external expert in the geospatial technology and agriculture industries. Vince Dinoto, Director of the NSF-ATE Geospatial Technology Center met with grant team to discuss remote sensing resources available to support PCC's Remote Sensing (GIS 115) on May 10, 2017. Also, the grant team met with faculty agriculture leaders from Clark State Community College to discuss specific software solutions and curriculum issues impacting precision agriculture education on May 25, 2017. Please see Appendix, **Pages 22-23: For the meeting agendas.**

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These changes were strongly supported by the Precision Agriculture Advisory Board with both short and long term approval of both curriculum changes, but as well commitment to help with marketing and hiring of program graduates.

**Goal 2: Improve and expand precision agriculture education opportunities at area high schools.**

**Associated deliverable: 1) Creation of new dual credit course, Introduction to Precision Agriculture, targeting at least 10 students registering each semester's offering of the course 2) creation of high school teacher professional workshops on precision agriculture concepts and career opportunities for students by serving at least 10 teachers 3) increasing high school outreach through the creation of high school outreach events through tours of Parkland's agriculture facilities, site visits to high schools, and development of new marketing materials producing projected enrollment gains in dual credit course annual enrollments from 50 to 65 students over the life cycle of the grant 4) improving recruitment of females into dual credit course through utilizing existing ATE resources on STEM recruitment strategies helping to attract females leading to enrollment gains of course demographics to reaching 50% female by the end of the grant cycle.**

In Fall 2016 PCC offered the dual-enrollment course, Introduction to Precision Agriculture (AGB 110), to local high school partners. Enrollment baselines for this course are listed below:

- Total students - 24
- High school students -12
- Male students – 13
- Female students – 11

Pre- and post-survey findings indicate evidence of gains by students in understanding the precision agriculture industry, technologies supporting the industry, and overall benefits to using precision agriculture techniques to increasing profits and field management of crops. Please see Appendix, **Pages 28-32: For pre-post survey results.**

High school faculty workshop targeting professional development for agriculture teachers is set for June 19, 2017. Pre- and post-survey questions have been developed for the event, however, findings for the event will not be available until the year-2 report relating to impacts on high-school faculty. The grant team plans to follow-up with a 6-month survey to test longer-term impacts of the event in reaching high students through their work with high school faculty partners.

See Appendix, **Page 35: Summer 2017 High School Teacher Workshop Brochure**

Increasing outreach with local high schools was achieved through a series of site visits with presentations targeting precision agriculture opportunities. The following table list the schools and student headcounts attending presentations with site visits in the Winter of 2017:

| <b>School</b>                               | <b>Headcount</b> |
|---------------------------------------------|------------------|
| Heritage High School                        | 25               |
| District 505 High School Counselors Meeting | 35 (counselors)  |
| Fisher High School                          | 50               |
| Oakwood High School                         | 65               |
| Hillsboro High School                       | 55               |
| Maroa-Forsythe High School                  | 18               |
| Richland Co. High School                    | 40               |

See Appendix, **Page 6: For High School Site Visit Data Summary**

No pre- and post-data is currently available to evaluate the effectiveness of these events in regards to student interest, improved career awareness, and student understanding of opportunities available at PCC to help students with moving into precision agriculture careers. The project team at this time is focusing on hands-on activities and demonstrations to engage students, however, new strategies are being explored to enable collection of pre- and post-activity data to explore the effectiveness of these events with students.

The project team also produced a series of events for students and parents with tours of PCC’s precision agricultural facilities. A series of events were held in the Fall of 2016 and Winter of 2017. The table below summarizes site visit events and numbers served:

| <b>Event</b>                     | <b>Headcount</b> |
|----------------------------------|------------------|
| Parkland College Open House      | 145              |
| Student-Parent Info Night (SPIN) | 6                |

See Appendix, **Page 6: For PCC Site Visit-Tour Data Summary**

The project team is still working with PCC’s IT staff to create a grant website as a central repository for grant resources being produced to share with partners. Some marketing materials are being produced to help with student and parent outreach to help them understand the new STEM field of precision agriculture. The grant team has produced a YouTube video to share SCATE Inc.

with counselors, students, and parents through the grant website. This resource with developing brochures and posters is likely to be targeted for dissemination in year-2 of the grant.

See Appendix, **Page 6: For Active YouTube Promotional Video Link**

The grant team is still in the early stages of leveraging strategies to increase recruitment of females into the Precision Agriculture Program at PCC. The team managed an informational booth at a college fair, Women Changing the Face of Agriculture, at the University of Illinois in March of 2017. This grant team estimates that 75 students visited the booth throughout the day.

See Appendix, **Page 7: Increased recruitment of high school women into dual credit and dual enrollment courses**

Goal 2 findings indicate major gains, but challenge remain in measuring and documenting success with outreach events with high school students. The creation of the new dual-enrollment course, Introduction to Precision Agriculture, appears to be well received and student enrollments appear to be strong. The grant team has shifted from an early goal of offering the course every semester to offering the course every other semester. Indicators and information from the grant team indicate their teaching loads and other institutional commitments are making it almost impossible to offer the course every semester. Offering the course every fall semester appears to be the best solution given faculty time constraints. One of the key highlights for the project is the high level of industry support and commitment for the course. The grant team working with industry partners, Helena Chemical Company and Monsanto Company, produced a scholarship program to reimburse students up to \$100 to complete the dual-enrollment course. The cost of the dual enrollment course is \$164 + fees. In this instance the course fee is \$6 so the total cost for the dual enrollment course is \$170. Once the Helena Chemical tuition award is applied the student cost is \$70.

See Appendix, **Page 34: New Precision Ag Class for HS Students this Fall**

This summer's professional development event for high school faculty appears with good marketing plans in place to attract participants and evaluation tools in place to measure success of the event in June of 2017. Outreach events and marketing tools for the project overall, however, are still in very early phases for the grant team. The team has no website and is limited with their ability to disseminate grant resources from a centralized location. In addition, high school site visits and tours to PCC's facilities are not well documented to support evaluation. Currently, the grant team understands this challenge and is working on new tools/methods to generate evaluation tools and data with very limited time during quick site visits to class rooms while hosting students with tours of their facilities.

**Goal 3: Improve compatibility between two-year college and 4-year university precision agriculture programs.**

**Associated deliverables: 1) Conduct outreach events with regional and state universities to improve and update articulation efforts with PCC's updated precision agricultural curriculum and program.**

See Appendix, **Page 7: Improve capability between 2-year and 4-year university precision agriculture curriculum.**

The grant team has met with agricultural advisors from both Illinois State and Southern Illinois University to discuss articulation efforts to include PCC's Precision Agriculture A.A.S degree. Currently, no formal agreements have been reached, however, the grant team appears confident that agreements will be reached within the grant's lifecycle for developing new career pathway options for precision agricultural majors at PCC.

**CONCLUSIONS:**

The Project Team is to be commended for their dedication to this project. They have worked diligently to achieve the goals for Year 1, however, some areas are progressing much faster than others relating to documentation to support evaluation of grant event outcomes and challenges. This year has been a building and learning year for a grant team new to the ATE system, however, one of the key strengths of the grant in year-1 relates to documented institutional support of the project. Parkland College has institutionalized success of the ATE project through a series of events, publication and awards to elevate the profile of the grant both within the institution, and across the larger community in the Champaign-Urbana, IL region. The following list of achievements documents some of these success stories in year 1 for the PCC grant team:

- Given presentation to the Parkland Board of Trustee on ATE Grant;
- President of Parkland has acknowledged the ATE Grant at both the opening day talks for Fall and Spring Semester to campus community;
- The PACE Project has been published in local newspapers with a couple of articles(<http://www.news-gazette.com/news/local/2017-03-25/shes-made-career-sharing-her-passions.html>);
- The local television station (news), WCIA, did a story about the project (<http://www.illinoishomepage.net/news/local-news/parklands-ag-program-to-benefit-from-3-year-nsf-grant/430307812>);
- The project PI, Jenni Fridgen, won a faculty innovation award relating to some of her work with the ATE Grant for PCC;
- Parkland has worked out a consortium agreement with other in-state colleges to support allowing students out of district to take Parkland's Precision Ag program for in-district rates.

Strategically, the Team has been well supported institutionally, and the broader campus community is aware of and is supporting the project. The Team did an excellent job with getting the new and modified precision agriculture courses approved in a timely manner to support grant goals. This timely support and approval is likely another indicator of higher level support for the project from PCC's administration. Enrollments for the courses and overall program are still evolving and challenging as reported by the project PI and Co-PI. Persistent are issues with promoting a new STEM program like precision agriculture include limited teacher, counselor, and student awareness of career possibilities in this rapidly growing field. These challenges speak to the importance of goal 2 which is to improve and expand precision agriculture education opportunities at area high schools to help build a pipeline of students for a sustainable/viable program with growing enrollments.

## COMMENTS:

1. Outreach events relating to high school site visits and tours of PCC's precision agriculture facilities are occurring in year-1. Documenting the success of these events is a challenge but is needed to take the evaluation beyond documenting just how many students were served or attended these events so that the impact may be understood. Different methodologies and evaluation approaches/questions, with metrics, are need to evaluate the relative success of these events. Discovering answers to the following questions would be very helpful in measuring the success of these outreach events with local high school students:
  - To what degree are students more informed about career possibilities with precision agriculture?
  - To what extent has student awareness and understanding grown regarding the academic and career pathways available through PPC's Precision Agriculture Program?
  - What is the degree of change in the interest level in pursuing precision agriculture career options among those students who attend an event the event at the conclusion of the outreach event?
2. Currently, the Team has no website to centralize resources for faculty, industry, and community partners working on the project. This issue needs to be addressed to help the team maximize their reach and dissemination potential to network resources with partners in year 2.
3. Industry partners have indicated their interest in supporting the project through a variety of mechanisms to help market the program. The Team is encouraged to explore all options with industry for providing financial support for students who choose the precision agriculture program of study (Industry partners report a shortage of skilled precision agriculture technicians), for support and help with marketing brochures, video



testimonials, and guest speaker roles to help communicate the importance of growing PCC's Precision Agriculture Program to meet local labor market demands.

4. The College is to be commended for the numerous ways they have helped the Team with disseminating awareness of the project across campus. This support will be needed as the team strives to achieve higher-level year 2 goals to document, build, and approve articulation agreements with four year partners with the College's new Precision Agriculture A.A.S Program.
5. The working relationship between PI and Co-PI appear very strong and collegial. They understand their roles and their division of labor is very clear relating to responsibilities on the grant.

## Year-1 Evaluation Timeline

### September 2016

- Conducted site visit with grant and external evaluation team at Parkland College.
- Worked on developing first draft of logic model for the grant team at Parkland College.
- Finished first draft of Logic Model for PCC.

### November 2016

- Met PACE Grant Team to review draft one of PCC Evaluation Logic Model.
- Finished final copy draft for PACE Logic Model with grant team to establish evaluation framework for the project.
- Worked on outlining surveys needed by project goal to help grant team with survey development.

### December 2016

- Conference call and agenda development to prepare for monthly conference call schedule to address PACE Logic Model and survey development for evaluation plan.

### January 2017

- Worked on final edits and feedback to produce final draft of PACE Logic Model for Parkland Team.
- Worked on editing survey question outline for grant project and coordinating project PI for correspondence to define to activity outcomes to support survey question development.

### March 2017

- Worked on site visit agenda development for PACE Grant Parkland Team and reviewed quarterly updates on team's activities.
- Met with grant team to discuss data collection, survey and upcoming events to prepare annual report.

### April 2017

- Summarized notes from meeting and prepared outline with dates, timelines, and survey goals for spring and summer 2017 data collection and annual report preparation.

### May 2017

- Met with grant with work on getting annual report outlined and final plans for data collection, survey development and external documentation needed for annual report organized with project PI.
- Organized site visit meeting notes to prepare annual report for summer 2017.

### June 2017

- Prepared and submitted NSF-ATE Annual Evaluation Report for PACE Project.