Objective 1:
To Increase the Number of Photonics Technicians in the U.S. via the High School to Community College pipeline.

Create a hybrid (online & face to face) Photonics (Lasers & Optics) Fundamentals dual credit course and offer it to Iowa's Secondary Schools. The schools were more than participative the first year.

For reasons blamed on COVID, there were few-to-no schools which meant few-to-no students. One high school, Ottumwa H.S., did participate.

Therefore, *to further the focus on outreach and recruitment*, it was determined take a Lasers & Optics show on the road as a Guest Speaker for secondary school teachers. The visits included custom presentations and demonstrations.

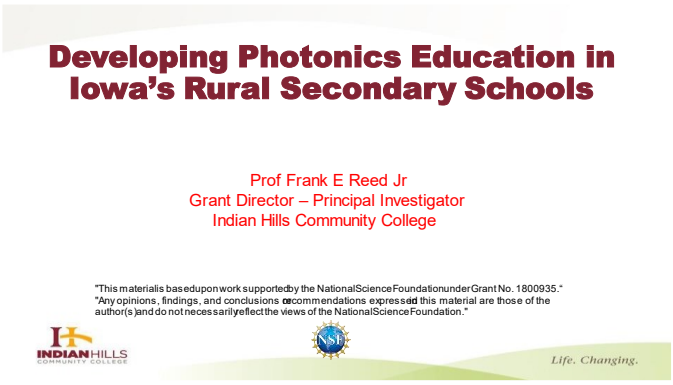
> The Annual Report for award 1800935 has been approved by Jill Nelson on 08/18/2021.
> Thank you for submitting your annual report and for the progress you made during this challenging year. In the coming year, I'd encourage you *to focus on outreach and recruitment* for high school students. COVID has made inclusion of high school students more challenging, so extensive recruitment and outreach is necessary *to maintain their involvement*.

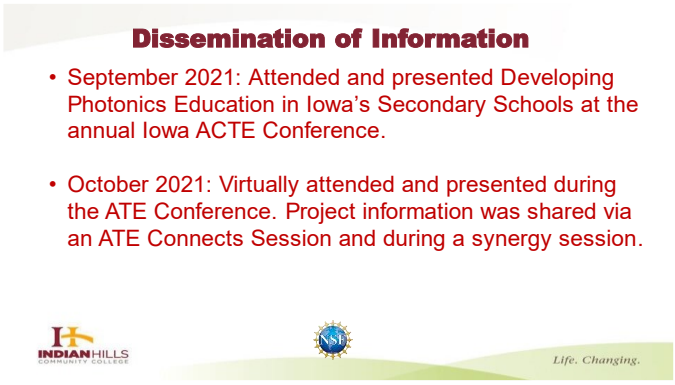
All nine Iowa Area Education Agencies were contacted (FA2021) via their Science Consultants.
They were asked to inform their science, career & technical education teachers of this opportunity.

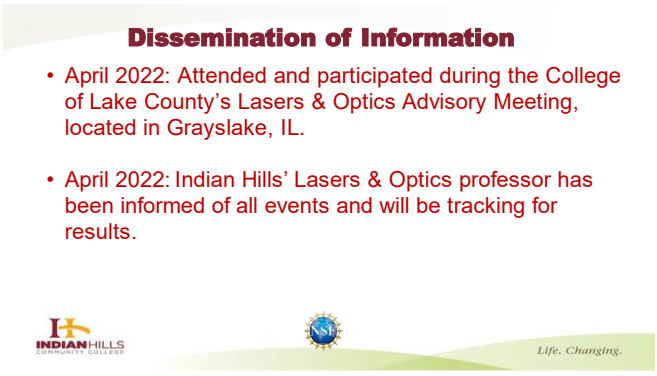
Immediate results were that six teachers responded with interest. Four schools and their science teachers took advantage of this opportunity. The AEAs were contacted again for the second semester, SP2022; no response.

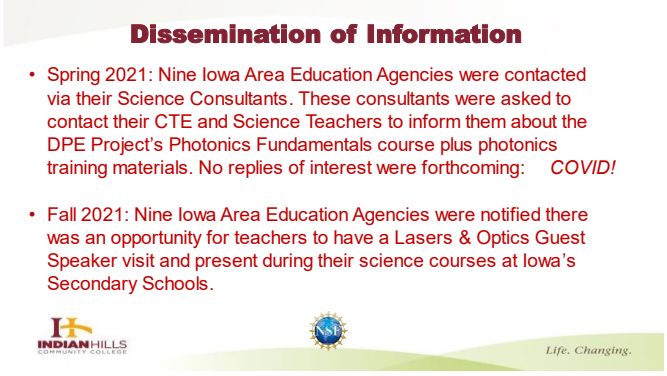
Offering teachers, a Guest Speaker in an area where they have little, or no knowledge was and is a great idea.

These are the results:
Developing Photonics Education (DPE) in Iowa's Secondary Schools









Iowa's Nine Area Education Agencies

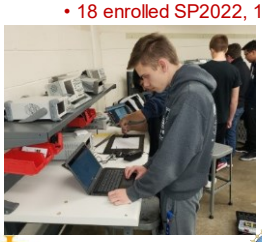
Photonics Fundamentals

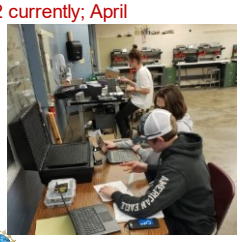
2020 – 2021 and 2021 – 2022 comparison.

- 9/2020 – 5/2021: Two participating high schools.
  - 3 starters, 1 completer
  - ***COVID is a *&^%!***
- 9/2021 – 5/2022: One participating high school.
  - 21 registered, 12 currently enrolled.

Ottumwa High School, Ottumwa, IA

- Doing labs with the project provided Photonics Kits.
  - 21 enrolled FA2021
  - 18 enrolled SP2022, 12 currently; April





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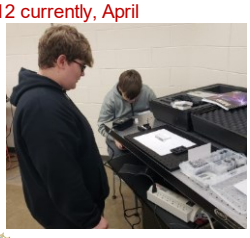

Iowa's Secondary Schools as Photonics Guest speaker

- October 2021: Wapello Jr/Sr High School, Wapello, IA
  - 65 students and 3 teachers
- November 2021: Maquoketa High School, Maquoketa, IA
  - 125 students and 2 teachers
- December 2021: Cedar Falls High School, Cedar Falls, IA
  - 150 students and 2 teachers
- March 2022: Treynor High School, Treynor, IA
  - 120 students and 1 teacher

~460 students and 8 teachers were introduced to the opportunities in the field of lasers & optics (photonics).

Career Days and STEM Days

- October 2021: Lucas County STEAM Festival targeting K -8th students and families.
  - >50 students and their parents
  - Challenged the students with a Laser Alignment game.
- October 2021: Chariton H.S. Career Day: October 28 th.
  - Presented to 8 students. Exhibited and spoke with 125 students, 1 counselor and 1 teacher
- December 2021: Ottumwa H.S. Career Day: Dec 10 th.
  - Exhibited and spoke with 270 students, 1 counselor and 1 teacher

~445 students and several counselors and teachers were influenced in the area of lasers & optics (photonics)

2021 – 2022 Year in Review

- Photonics Fundamentals: One high school scheduled the course.
  - 21 started, 12 completers
- Guest Speaker:
  - 465 students and 8 teachers were informed of the science of light, laser/optics applications and laser/optics career opportunities
- Community STEAM and Career Days:
  - 445 students and several counselors/teachers were introduced to photonics.
- >920 students now know about photonics and the future it holds.

Symposium & Institute

- Two symposiums were scheduled during the 2021 – 2022 school year.
  - First: Two consecutive Saturdays in December 2021.
    - No interest.
  - Second: Two consecutive Saturdays in March 2022.
    - No interest.
- The 2022 summer institute will not be scheduled as the project funds run out May 19 th, 2022, so the project ends then.

"This materialis basedupon work supportedby the NationalScienceFoundationunder Grant No. 1800935."
"Any opinions, findings, and conclusions orrecommendations expressed this material are those of the author(s)and do not necessarilyreflectthe views of the NationalScienceFoundation."

These are the results:

DPE Guest Speaker in Iowa's Secondary Schools

1. October 2021: Wapello Jr/Sr High School, Wapello, IA
   65 students and 3 teachers

2. November 2021: Maquoketa High School, Maquoketa, IA
   125 students and 2 teachers

3. December 2021: Cedar Falls High School, Cedar Falls, IA
   150 students and 2 teachers

4. March 2022: Treynor High School, Treynor, IA
   120 students and 1 teacher

Total: ~460 students and 8 teachers have been introduced to lasers & optics.

These are the results:

DPE @ Career Days

5. October 2021: Lucas County STEAM Festival targeting K-8th students and families.
   >50 students and their parents
   Challenged them with a Laser Alignment game; awarded a Photonics Kit as the prize.


6. October 2021: Chariton H.S. Career Day: October 28th.
   Presented to 8 students. Exhibited and spoke with 125 students, 1 counselor and 1 teacher

7. December 2021: Ottumwa H.S. Career Day: Dec 10th.
   Exhibited and spoke with 270 students, 1 counselor and 1 teacher



~445 students, several counsellors & teachers were informed of photonics career opportunities.

These events were deemed a success as approximately 900 students and 15 counsellors/teachers were influenced.