

OPEN Optics and Photonics Education News

Newsletter of the Optics and Photonics College Network

October 2018

Improving Student Retention



From the Executive Director



By mid-October, most new photonics students have experienced their first six weeks of college, and many of them are struggling to keep up. Photonics faculty are also "struggling" to prevent these new students from dropping out or changing majors.

Student retention in photonics technician programs is not easy, but it can be achieved if new students are given a vision of the rewarding careers they are preparing for, integrated into the photonics student community, welcomed and encouraged by the faculty, challenged to work hard, and provided effective support to overcome their academic deficiencies. Student retention is the major focus of this OPEN issue.

Articles by Frank Reed and Chrys Panayiotou describe successful practices that these experienced faculty use to prevent student dropout. The OP-TEC monograph, *Best Practices to Improve Retention of Photonics Students*, contains advice, strategies and resources for student retention, from seven other experienced faculty. OP-TEC has also developed audio/video tutorials for learning difficult math, science and technology concepts in the course *Fundamentals of Light and Lasers*. Struggling faculty can benefit greatly from the advice and resources in these four articles.

Faculty can also benefit from networking with each other through the LinkedIn Group of the Optics and Photonics College Network (OPCN).

Dan Hull

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Upcoming Events

10/10/18 - 10/12/18
National Career Pathways
Network (NCPN) Annual
Conference
Louisville, KY

10/24/18 - 10/24/18
NSF ATE PI Conference
Omni Shoreham Hotel
Washington, DC

2/2/19 - 2/7/19
SPIE Photonics West
Conference
San Francisco, CA

03/14/19 - 3/15/19
OPCN Meeting
CREOL Industrial Affiliates
Symposium
Orlando, FL

07/22/19 - 07/25/19
High Impact Technology
Exchange Conference
St. Louis, MO

[View Events Webpage](#)

[NSF 2026 Idea Machine](#)

Audio/Visual Aids for Teaching Fundamentals of Light and Lasers: Are you using all your resources?

OP-TEC has developed a host of audio/visual aids for instructors teaching with the *Fundamentals of Light and Lasers* textbook. These tools can help struggling students get back on track. Instructors and students can access all of these resources in one convenient **Teaching and Learning Tools Index** available at <http://www.optecvideo.opteccrm.org/fundamentals-of-light-and-lasers>.

Take a look at the chart below to see if you are using these tools to your best advantage.

	<p>Photonics Concept Tutorial Videos (6) Six tutorial videos are available to provide additional instruction for key photonics concepts that students may find difficult to understand. The videos range in length from 7 to 27 minutes. Each module contains one concept tutorial video which is referenced in the textbook with a light bulb icon.</p>
	<p>Mathematics for Photonics Education Videos (11) Eleven math videos are provided to assist students in performing mathematical operations required in the textbook. To help instructors plan their class activities, the preface of each module lists the mathematics concepts to be covered in the module. A calculator icon appears in the textbook in the place where the mathematics topic is first used.</p>
	<p>Lab Activity Videos (23) Lab videos have been created to prepare students for the hands-on laboratories recommended to be conducted at the end of each module. The videos range in length from three to twenty minutes, and are referenced in the textbook with an Erlenmeyer flask icon.</p>
<p>A 5, 8</p>	<p>Interactive Applets (50+) More than 50 external links to additional interactive elements that can help students visualize concepts are noted in the textbook with a large capital letter "A" with the corresponding applet number(s) referenced below it.</p>
<p>eText Videos</p>	<p>Several of the full-length videos referenced above were shortened into smaller, on-demand clips for the eTextbook version of <i>Fundamentals of Light and Lasers</i>. Students can access the clips from the Teaching and Learning Tools Index.</p>
<p>eText Widgets</p>	<p>Interactive widgets created for the eTextbook version of <i>Fundamentals of Light and Lasers</i> allow students to interact with textbook images by adjusting controls with their computer keyboard and mouse to visualize how changes to certain factors can affect the properties of light. Students can access the widgets from the Teaching and Learning Tools Index.</p>
<p>Presentation Images</p>	<p>Enlarged figures and images from <i>Fundamentals of Light and Lasers</i> are available to instructors as downloadable presentation slides (PowerPoint and PDF) by</p>



The National Science Foundation (NSF) announces the launch of the NSF 2026 Idea Machine, a prize competition to help set the U.S. agenda for fundamental research in science, technology, engineering, and mathematics (STEM) and STEM education. Participants can earn cash prizes and receive public recognition by suggesting the pressing research questions that need to be answered in the coming decade, the next set of "Big Ideas" for future investment by NSF. It's an opportunity for researchers, the public and other interested stakeholders to contribute to NSF's mission to support basic research and enable new discoveries that drive the U.S. economy, enhance national security and advance knowledge to sustain the country's global leadership in science and engineering.

Entries will be accepted through October 26, 2018. For more information, including entry instructions, eligibility, rules, and judging criteria, please visit the NSF 2026 Idea Machine website.

Progress Update on New
OPCN LinkedIn Group



The Optics and Photonics College Network LinkedIn Group was formed as a result of conversations during the

Supporting Struggling Students at Indian Hills Community College

If you are not
STRUGGLING,
you are not
LEARNING.

In recent years, over 90% of the students at Indian Hills Community College who enroll in the Laser/Optics Program, successfully complete these courses and enter employment to begin rewarding careers as laser/optics technicians. This significant improvement in student retention is the result of the following deliberate efforts by Frank Reed and other IHCC faculty:

- 1) Helping New Students to Avoid the Need for "Struggling to Keep Up"
 - Introduce yourself in a friendly manner.
 - Discover who they are, and why they chose to become a photonics student.
 - Encourage them to improve and stabilize themselves: physically, mentally, financially, and socially.
 - Explain the demands of this rewarding program: difficult courses require good time management and diligent study habits to keep up with the class.
 - Require them to develop successful student characteristics: prompt attendance, strict attention in class/labs and deactivated cell phones.
- 2) Developing a Sincere, Positive Relationship with All of Your Students
 - Trust them all, suggest ways they can maintain your trust and continually treat them all the same.
 - Be consistent in your directives and fair to all students.
 - Provide clear, explicit assignments, require lab notebooks and give frequent, non-threatening quizzes.
 - Involve all class members in Q&A, discussions and presentation assignments.
 - Compliment deserving students.
- 3) Identifying and Assisting Students who are Falling Behind.
 - Meet with struggling students, encourage them, help them identify their weaknesses and develop a plan. Engage the struggling students to set goals for improvement, and require them to accomplish the goals.
 - Encourage mentoring from other class members.
 - Provide appropriate tutorials and in math, science and technologies.
 - If some struggling students are not responding to the help, explain to them the consequences of not catching up.

annual OPCN meetings at the HI-TEC Conference in July.

The LinkedIn Group provides a communication tool for open discussions among members that can be accessed when needed. OP-TEC currently uses email and this newsletter for sharing information with OPCN, and encourages this sustainable platform which allows all OPCN members to easily and spontaneously ask questions, share information, and begin conversations when needed.

OPCN member, Jonathan Friedman (Puerto Rico Photonics Institute), volunteered to set up the new group for OPCN. Since the OPCN Meeting in July, several posts have been added, operating procedures have been drafted, and 26 members have joined the group.

OPCN Committee Chairs will help manage subsets of the group by acting as subject matter experts, monitoring activity and responding to posts and questions related specifically to their committee's focus. Any member with knowledge or experience is welcomed to contribute by "Liking" and/or adding comments and suggestions to a post.

Primary Contacts/Managers:

Professional Development:

Anca Sala (Baker College)

Program Assistance:

Gary Beasley (Central Carolina Community College)

Equipment:

Frank Reed (Indian Hills Community College)

Student Recruiting:

Christine Dossey (OP-TEC)

Why you should join:

It's easy and convenient to request and receive information, advice, share expertise, locate equipment, have useful conversations with colleagues, and build relationships with employers.

1. Create an Account:

You will need a LinkedIn account in order to join the OPCN Linked In Group. To get started, watch this video tutorial https://youtu.be/fuy4DjBWN_k.

For questions, or further suggestions contact Frank Reed at frank.reed@indianhills.edu.



Retaining Photonics Students at Indian River State College

Encouragement and motivation

Instructors talk to the students frequently and remind them that they are gaining the knowledge and skills that will prepare them for a rewarding career in two years. This frequent reminder, with examples of graduates, where they work, what they do and how much money they earn, keeps students motivated to persist and finish the program.

Continuous monitoring of student's progress and assistance with problems/obstacles

Instructors take attendance every day, especially in the beginning of the semester. If a student doesn't attend class, instructors email and call to find out what has happened and how can they help. The instructors also help by connecting the student with other classmates, who can assist in solving their problems. Reaching out to help and showing the humanity of the college and its instructors does a lot in gaining trust and retaining the student.

Academic monitoring

Instructors assign homework and quizzes so they have a grade for each student by the third week. This identifies the students that need the most help. With this information, the instructors can approach the students with warmth and encouragement, which helps the student improve and become successful.

Create learning communities

Create an environment where all students (first and second year) can gather together and assist each other. It can be the lab with certain open lab hours accessible to everyone, or a laser/ photonics club with a designated place where the students can gather and work together. Encourage second year students to talk about their experiences in the classroom, interact with the first year students, and give them advice on how to be successful.

Help students visualize their goal of employment

Help the students see where they may be working when they complete their degree. Remind the students a field trip is scheduled mid-semester where they could possibly work, and will have the opportunity to present questions to the employer and technicians working there. Show videos of former students who are working.



Best Practices to Improve Retention of Photonics Students

A poll of faculty from well-established photonics programs at seven colleges revealed that, for most of them, initial dropout

2. Join the Group:

The OPCN Group has been set up as a Private Group which requires an invitation from a Manager of the group. Jonathan Friedman and Christine Dossey have been locating and messaging OPCN members with LinkedIn accounts; if you have received one of their invitation messages be sure to accept. If you have recently joined LinkedIn, or if you already have a LinkedIn account but haven't received an invitation to the OPCN Group, send a quick message or email to gordonfsnyder@gmail.com or jsfriedman@suagm.edu requesting to join.

3. Select Your Notifications:

Change your email notification frequency settings to view posts daily or weekly. For instructions on changing your settings, refer to this LinkedIn Help link, Changing the Frequency of Group Emails: www.linkedin.com/help/linkedin/answer/5273.

Future issues of the OPEN newsletter will contain updates about using LinkedIn to stay connected with OPCN members and interested employers.

Comments and suggestions are welcome.

PACT Alumni Spotlight

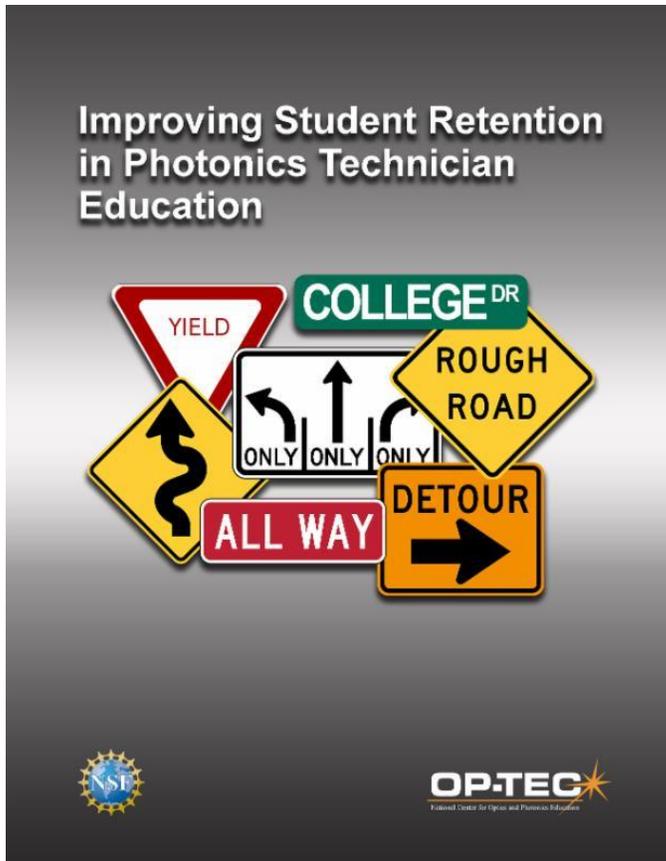


Woodrow D. (Woody) Morrison III worked as a millwright, construction worker, and bartender until an accident in April 2004 ended his ability to do heavy physical labor. As a result, he had to consider a new career path. "I went back to school and decided to study photonics," Woody recalls. "Technology industries will

rates for first-year students exceeded 50 percent, due to:

- Inadequate screening and counseling of student applicants.
- Inappropriate testing and academic remediation of incoming students.
- Lack of student commitment; immature students.
- Failure to remain motivated
- Lack of a "support group" of fellow students
- Low mathematics course placement, resulting in extensive math remediation.

Faculty members at these colleges have created strategies that have reduced their student attrition significantly. This OP-TEC monograph records their practices, along with resources that can be adapted and used by others.



Copies of the OP-TEC improving student retention monograph can be requested from the OP-TEC store website at www.optecstore.org.

continue to grow, even with the recession."

Before Woody could graduate from Indian Hills Community College (IHCC) and get a photonics job, there were a few hurdles in his path. Two of the largest were his changed physical condition and his struggle to understand college-level math. Returning to school for the first time in 23 years, Woody knew that the math would be the greatest challenge for him. Luckily he found someone who was able to tutor him. "Don't be afraid of math," he advises. "Once I had completed core classes and began the study of photonics, it all came together."

Now Woody works for Spectra-Physics building imaging lasers. It didn't take long for him to go from an entry-level laser tech II to his current position. "I'm the lead technician in Spectra Physics' Vanguard division," he says proudly. "We build the Vanguard 350mw and the 2.4 watt lasers."

Woody lives by the principle that "you reap what you sow." This frame of mind is a huge factor in Woody's success at work and in life. "If you see the goal and you want it, don't let something like math, or even a life-altering injury, put you on the sideline. There are ways to get past them. Not around them, not over them, but through them."

Read more about Woody and other successful technicians in [Success Stories in Photonics Careers](#).

OPCN Committees

The Committees of the Optics and Photonics College Network are dedicated to sharing expertise, best practices, resources, and advice on issues of importance to photonics technician educators at colleges throughout the United States.

Professional Development Committee

Anca Sala, Chair
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**For Previous Issues of the
OPEN Newsletter please
visit OP-TEC's [News Page](#).**

Join the Conversation

We hope you enjoyed this edition of the OPEN newsletter. We would really like to hear from you. If there is some subject that you would like us to discuss or look into, please let us know at prmanager@op-tec.org.

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