

**Next Gen identifies Optics as a major economic growth industry**  
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## **Optics Cluster**

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**Climbing the photonics education ladder**

Workforce development usually appears in the context of issues and challenges. In November the **New Mexico Optics Industry Association** celebrated workforce development as a success, devoting a meeting to what NMOIA co-founder **Art Guenther** calls the optics and photonics education ladder. On hand were representatives from each rung.

They started with the **Photonics Academy**  
<[http://rs6.net/tn.jsp?t=xvk5fzaab.0.5h98hzaab.xy856wn6.447&amp;p=http%3A%2F%2Fwww.aps.edu%2Faps%2Fwmhs%2Fatca%2Facad\\_photo\\_home.html](http://rs6.net/tn.jsp?t=xvk5fzaab.0.5h98hzaab.xy856wn6.447&amp;p=http%3A%2F%2Fwww.aps.edu%2Faps%2Fwmhs%2Fatca%2Facad_photo_home.html)> at **West Mesa High School**.

A few years ago, when both optics professionals and **Sandia National Laboratories** started to see a shortage of young talent in the pipeline, **Dominique Foley-Wilson** of Sandia led a successful effort to get DOE funding for a program that would begin in middle school and continue through TVI and UNM. Other key players were Art, Tom Daly at West Mesa and Robert Hall at TVI.

"Sandia is interested in pipeline programs because we're having a critical skills shortage," said Dominique. For that reason, she said, the DOE took the unusual step of funding a program that begins so early. Together labs, industry and teachers created a four-year curriculum to not only teach optics but guarantee math and science proficiency.

The Photonics Academy, launched in 2001, followed a similar program in manufacturing technology started at West Mesa in 1997. The photonics program begins in West Mesa's feeder middle schools, where students with math and science skills are exposed to optics and photonics and the potential for careers. Interested students enter the academy at West Mesa, and in their senior year take classes at both West Mesa and TVI. When they complete the program they're ready to enter the workforce or continue on at TVI or UNM.

**Tom Daly**, the lead instructor at West Mesa, said the program has 108 students -- two-thirds of them male and 75 percent Hispanic. Their GPA

ranges from 3.2 to 4.4. Many in the program were barely earning a 2.5 when they entered the program. The program's dropout rate is negligible.

"These are students who might not otherwise succeed who are succeeding beyond anybody's expectations," said Art.

Currently two students are interning at Sandia; five graduates are continuing their studies at TVI, and 15 of the program's graduates have found jobs at Sandia.

The model has been so successful that the DOE has supported a similar program in microsystems at Bernalillo High School.

**Bob Hall**, of **TVI**, said the program's success led to his institution working with McGraw Hill on a book about standards for manufacturing training in optics and laser technology. "When you have Art Guenther behind you, you can't fail," he said.

TVI's own Photonics Program

[http://rs6.net/tn.jsp?t=xvk5fzaab.0.4h98hzaab.xy856wn6.447&amp;p=http%3A%2F%2Fbohr.tvi.edu%2FPrograms%2FPhotonics\\_Technology%2Fprogramhome.html](http://rs6.net/tn.jsp?t=xvk5fzaab.0.4h98hzaab.xy856wn6.447&amp;p=http%3A%2F%2Fbohr.tvi.edu%2FPrograms%2FPhotonics_Technology%2Fprogramhome.html) is well established and offers both certificate and associate degrees. Now the school is developing a biophotonics program with UC-Davis. It just announced its first introductory course, and in less than a week 63 students signed up, said **Joel Gellman**.

UNM has a well known Optical Science and Engineering Program

<http://rs6.net/tn.jsp?t=xvk5fzaab.0.ai98hzaab.xy856wn6.447&amp;p=http%3A%2F%2Fwww.optics.unm.edu%2F> taught by physics and electrical engineering faculty and offers Ph.D. and master's degrees, said **Marek Osinski**. The master's program internship involves one or two semesters in the labs or industry working on a project of interest to that organization. Then the student writes a report instead of a thesis to earn a master's degree. A new program at UNM provides graduate teaching fellows to the West Mesa Photonics Academy and feeder schools all the way to elementary level. And the university is preparing to develop curriculum for a bachelor's degree in optics with input from NMOIA.

Optics professionals have helped develop curriculum and raised money through the **Directed Energy Professional Society**

<http://rs6.net/tn.jsp?t=xvk5fzaab.0.bi98hzaab.xy856wn6.447&amp;p=http%3A%2F%2Fwww.deps.org%2F> (DEPS) to provide equipment. **Denny Boesen** said the group, organized five years ago to foster communication and stimulate interest in the field, has 1,000

members. DEPS has made equipment grants to West Mesa and TVI, developed and distributed optics kits for middle schools and provided teacher training. It's also provided scholarships.

A high point of the meeting was the appearance of three celebrity guests -- students in the West Mesa program. **Diane Sanchez, Andrew Montoya** and **Anthony Montoya** described what they'd learned and how they'd used it. Diane and Anthony put their skills to good use in internships with Boeing and Sandia.

The support network for all these activities is the **New Mexico Alliance for Optics & Photonics**

**Education.** Partners are Air Force Research Lab, DEPS, Sandia, NMOIA, Optical Society of America, SPIE, IEEE, Center for Occupation Research and Development and Joint Technology Office/ High Energy Lasers.

Within the alliance, Hall said, "there are no egos at the table. We all have the ultimate goal of making sure we have a career path. We have equipment, labs, curriculum, instructional prowess of the faculty and the backing of the community and the industry. A lot of things came together to make sure we have what we need to do this program."

Said NMOIA President **Jim McNally**: "One of the primary focuses of NMOIA is the development of a qualified optics workforce. We are very pleased to have an excellent working relationship with the academic sector and to support Sandia's efforts in optics workforce development."