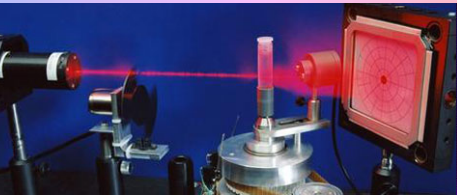


SUMMARY:

- Ensure there are the right number of photonics workers, at the right skill level, in the right technologies, in the right regions, at the right time to support the growth of the US photonics industry.
- National resources include: All of the 2-year, 4-year and graduate programs, OSA, SPIE programs, Op-TEC, NPI Taskforce of Education and workforce development, AMTech NTRP program, Eventual optics and photonics IMIs
- Challenges:
 - Need better data on the job market
 - Difficult to get HS graduates interested in careers in optics and photonics
- What can an institute do to solve the question of getting right # of students and skills level:
 - Want to have better data. Would like to have a better idea about the market needs.
 - Have to produce the best students they can get. Even if have no idea about the return, they have to make sure they provide the right workforce for the industry.
 - Need to provide new leadership for the next generation
- Want to see more collaboration between the three institutes. This is nationwide. Talk about strategic plan. Double masters degrees.
- In absence of statistics, there is a known need that is unfulfilled - especially at the technical level.
 - At CREOLE started an undergraduate degree. Recruiting isn't hard, what's hard is recruiting the right type of student.
 - The move is to promote STEM. And specifically optics.
 - How to implant manufacturing in existing curriculum - it should be a focus.
- Graduate about 8 or 9 students every year - with 4 or 5 offers.
 - It is convincing the parents to send their children to optics.
- Curriculum development - undergraduate program is doing very well - reviewed on a yearly basis
 - Masters - they immediately go into the work force and they are taking the PhD courses.
 - Masters are not prepared for industry - need to re-think about master's students.
 - Capstone projects - important

- IMI should be a home to promote manufacturing in a setting
- Size of programs:
 - RH - only up to masters - graduate 8 masters, and 8 undergrads - program in physics
 - 25 PhD students, 22 went to industry, 3 to research as post-doc
- Industry is not paying enough
 - Can't compete with CS - \$125K, vs. \$75K max for photonic graduate degree
- At RIT don't get industry interested enough to fund more students
 - If IMI could help fund students it could help increase the population
 - Could bring in and manage and write proposals for it
- Most of the people that graduate and work in photonics come from electrical or mechanical with a focus on optics
 - This effort should maybe learn to strengthen concentrations in other departments and then specialize in photonics
- University of Maryland - have fair number of faculty covering optics
 - Students learn skills by taking other courses
- Jim: Using optics and photonics simultaneously
 - When think about what we're describing, when writing grants and funding opportunities, need to make sure that defining what they are talking about.
 - Optics is broader from EE - everyone brings bias - we want to teach students to be effective in whatever situation they are in.

Education and Workforce Development for the U.S. Photonics Industry



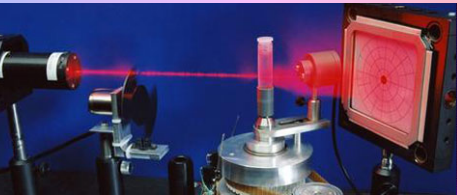
NTRP

National Technology Roadmap for Photonics

NIST
National Institute of
Standards and Technology
U.S. Department of Commerce

Objective

Ensure there are the right number of photonics workers, at the right skill level, in the right technologies, in the right regions, at the right time to support growth of the U.S. photonics industry



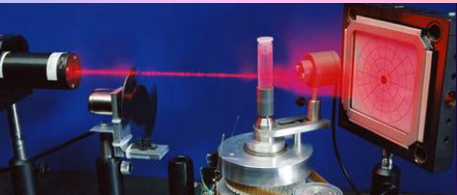
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National Resources

- All of the 2-year, 4-year, and graduate programs
- OSA, SPIE programs
- OP-TEC (a NSF Advanced Technological Education Program in Waco, TX)
- Others?
- Recent activities
 - NPI Taskforce of Education and Workforce Development
 - AMTech NTRP program
 - Eventual optics and photonics IMIs

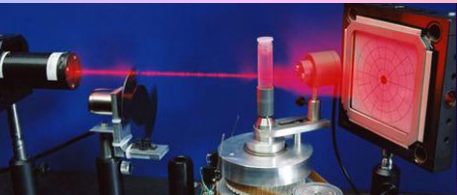


NTRP

National Technology Roadmap for Photonics

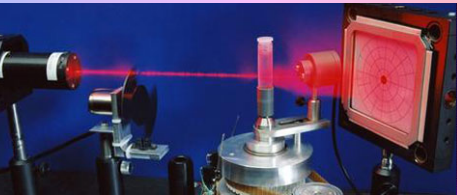
Challenges

- We need better data on the job market (now and future!)
 - What skills are required?
 - What levels?
 - How many people?
 - Where?
 - When?
- How can the colleges and universities optimize their optics and photonics curricula to meet the needs of the market?



Challenges

- It is very difficult to get high school graduates interested in careers in optics and photonics
 - Not just any students – the best and brightest
 - Not recognized like EE or MechE at the HS level (or by parents!)



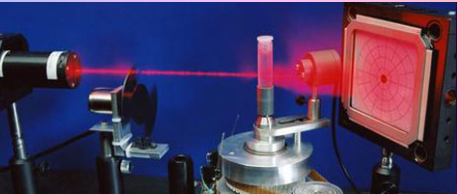
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NPI Taskforce on Education and Workforce Development

- Leader – Matthew Weed, Open Photonics
- Three part strategy
 - Careers marketing
 - Skills roadmapping
 - Industry-partnered training



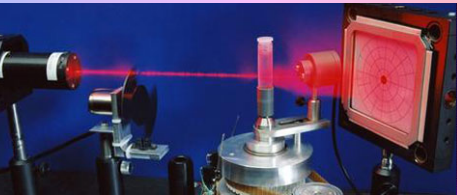
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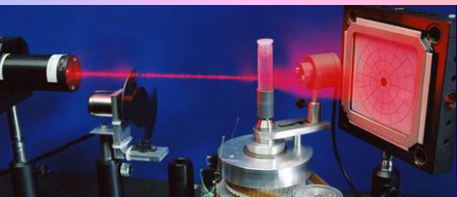
Discussion Questions

- How can the NTRP grant help support the NPI Taskforce on Education and Workforce Development?
 - Careers Marketing
 - Skills roadmapping
 - Industry-partnered training
- How would a photonics-centric IMI support the nation's photonics workforce need?
- How would an IMI best collaborate with existing efforts (OP-TEC, the NPI, etc)?



Discussion Questions: *Industry Influence*

1. How could an O&P employers coalition best communicate a skills roadmap to academic institutions?
2. How could such a coalition aid in the execution of such a roadmap that demands an adaptive curriculum?
3. How could such a coalition accredit training programs in post-secondary landscape?

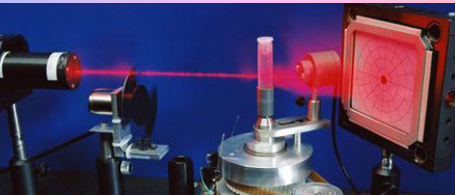


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National Technology Roadmap for Photonics

Discussion Questions: *Government/Agency Influence*

1. What can governments and agencies do to off-set the cost of adding and up keeping technology in classrooms?
2. What such groups do to communicate O&P as a field of key strategic and economic importance to the broader citizenry?



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