

**MONTANA PHOTONICS INDUSTRY ALLIANCE
2015 INDUSTRY SURVEY**

July 10, 2015

I. BACKGROUND

The second annual Montana photonics industry survey was conducted in the spring of 2015 to better understand the size, composition and needs of the optics/photonics industry in Montana. All of the organizations identified to date as “optics and photonics organizations” are located in the Gallatin Valley.

II. OBJECTIVES

1. Estimate the current number of employees and payroll (wages and direct benefits) of Montana optics and photonics organizations.
2. Identify ways in which the Montana Photonics Industry Alliance can better serve its members and help them become world leading organizations.

III. DEFINITION OF OPTICS AND PHOTONICS ORGANIZATIONS

We define Montana optics and photonics organizations to include those that meet one or more of the following criteria:

- a. Manufacture or sell products that rely on optics or photonics technology for a significant portion of their functionality. Examples include companies that manufacture or sell lasers, laser ranging systems, optical spectrometers, or optical materials such as silicon and laser crystals.
- b. Derive a majority of their revenue from products that are sold into the optics or photonics market. Examples include companies that sell laser power supplies and companies that sell cryogenic cooling systems used in photonic research.
- c. Departments and other groups within universities that teach and/or engage in optics or photonics research. Examples include the MSU Physics and EE/Optics programs, the Optical Technology Center, and Spectrum Lab.

IV. MONTANA OPTICS AND PHOTONICS ORGANIZATIONS

The following 28 organizations meet the definition above and were included in the survey. All of the photonics companies surveyed are located in or near Bozeman, Montana. Of the 28 organizations surveyed, all but two provided data for the survey.

AdvR, Inc.
Altos Photonics

New Wave Research
Newport/ILX Lightwave

Bridger Enterprises
 Bridger Photonics
 FLIR/Scientific Materials
 Image Labs International
 Inrad Optics
 LaserDiodeSource
 Lattice Materials Llc
 MicroLab
 Montana Instruments
 Montana Molecular
 Montana State University
 New Gate Technologies, Inc.

NWB Sensors, Inc.
 Phenix FO
 Quantel USA (formerly Big Sky Laser)
 Quantum Composers
 Resonon, Inc
 Revibro, Inc
 S2 Corporation
 Sensopath Technologies
 Sensory Labs
 Teledyne/Photon-Machines
 Wavelength Electronics
 Yellowstone Scientific Instruments

V. NUMERICAL SURVEY RESULTS

Following are the numerical results of the 2014 and 2015 surveys. Estimates for headcount and growth rate have been used for the companies for which no data was available. It is believed that these estimates result an uncertainty in the headcount presented below of less than 5% in 2014 and 2% in 2015.

	<u>2014</u>	<u>2015</u>
Number of organizations surveyed	25	28
Number of responses received	20	26
Number of employees	460*	517*
Forecast headcount growth	6.7%	11.1%
Number of employees, excl MSU	356	411
Forecast headcount growth, excl MSU	8.7%	13.3%
Average pay and benefits per employee	\$60,934	---
Average pay and benefits per employee, ex MSU	\$71,961**	\$59,461**

*Includes approximately 80 students employed in optics or photonics related research at MSU

**Note On Payroll Data - Average pay and benefits per employee data includes results from the 17 organizations that provided payroll data. The payroll information reported for 2015 is considered to be more accurate than that presented for 2014 for a variety of reasons. The following question was used to solicit payroll information:

What was your total payroll cost during 2014? Include wages, bonuses, severance pay, and profit distributions.

This question was worded differently than in the 2014 Annual Survey in order to allow comparison of our data to that reported in the Bureau of Labor Statistics Quarterly Census of Employment data.

VI. RESULTS OF NARRATIVE SURVEY QUESTIONS

Narrative survey responses were analyzed and grouped into response categories with the following results. Additional insights can be gleaned by reading the individual narrative responses which are included in the Appendix.

A. What value does MPIA bring to your organization? (23 responses)

The three most common answers were:

- Networking – community, 91%
- Offering seminars, 22%
- Recruitment (university or outside), 17%

B. What are the top three things that the Montana Photonics Industry Alliance could do over next three years that would benefit your organization? (20 responses)

The three most common answers were:

- Provide networking opportunities, 45 %
- Promote Montana photonics inside and outside the state, 40%
- Training/Education inside Montana, 25%

It is also worth noting the following additional response categories:

- Assist in securing funding sources, 22%
- Assist in recruiting, 20%

C. Was there a new spin off company for your technology in 2014? Is the spin off company located in Montana? (21 responses)

The three most common answers were:

- No, 90%
- Revibro (officially started in 2015), 10%
- Additional patent filed, 5%

VII. GOALS SHARED WITH MAIN STREET MONTANA

Governor Steve Bullock initiated the Main Street Montana Project in early 2013 with the overriding objective to write a business plan for Montana, by Montanans. The Main Street Montana Project plan was released in early April 2014. It identifies five Pillars upon which the plan is built. These five pillars along with supporting key goals are listed below.

Many of the key goals of the Main Street Montana plan are closely aligned with the goals of Montana's photonics industry. These key goals are underlined in the summary below and

suggest areas for collaborative partnerships between the MPIA and city and state government. Details of the Main Street Montana Project may be found at:

www.mainstreetmontanaproject.com.

Main Street Montana Project Pillars

1. Train and Educate Tomorrow's Workforce Today - The importance of a well-educated, trained and skilled workforce was the most consistent and frequent message heard from all corners and all constituencies.

Key Goals:

- (1) Align educational system with the needs of a changing economy
- (2) Engage private-public partnerships to provide job training, apprenticeship, and professional development opportunities
- (3) Provide a lifetime continuum of quality education from pre-school through adulthood

2. Create a Climate that Attracts, Retains and Grows Business - Montana is a good place to do business, but it can and should be improved.

Key Goals:

- (1) Foster a business-friendly climate through efficient and effective government
- (2) Increase access to capital and resources for Montana businesses
- (3) Coordinate economic development efforts throughout the state

3. Build Upon Montana's Economic Foundation - Montana is known as the Treasure State for good reason. We provide resources that produce energy and wealth, we help feed the nation and world, and we have incredible outdoor opportunities to offer both residents and visitors.

Key Goals:

- (1) Responsibly develop Montana's natural resources for long-term economic growth
- (2) Ensure Montana businesses and communities have efficient and reliable infrastructure
- (3) Protect Montana's quality of life for this and future generations

4. Market Montana - We have a good product in Montana. We believe we can improve it. But we also need to do a better job of marketing it.

Key Goals:

- (1) Strengthen and promote the Montana brand to recruit businesses, workers and tourists
- (2) Increase promotion of Made in Montana products and exports

5. Nurture Emerging Industries and Encourage Innovation - Technology and innovation are increasingly the drivers of economic, job and wage growth across the globe. Montana needs to participate.

Key Goals:

- (1) Strengthen role of universities as technology incubators through research, development and commercialization
- (2) Foster innovation and encourage knowledge-based industries to locate and grow in Montana
- (3) Support entrepreneurs and small businesses to enhance their potential to achieve growth and stability

VIII. CONCLUSIONS

- The photonics industry in Montana encompasses 28 organizations which employed approximately 517 people at the end of 2014. Employment within the industry is expected to grow approximately 11% in 2015.
- Excluding university system faculty and paid student researchers, average pay and benefits within the industry was approximately \$59,461 at the end of 2014.
- Narrative comments from the survey provide insights into opportunities for the MPIA, city, and state government to help the industry grow. (See “Results of Narrative Survey Questions” above.)

APPENDIX FULL SURVEY NARRATIVE RESPONSES

To preserve anonymity, respondents are identified only by a number. The correspondence between the number and the respondent is recorded in a separate, numerical results worksheet.

A. What value does MPIA bring to your organization?

1. None quite yet, only been members for a few weeks. Looking forward to getting more involved though!! [1]
2. MPIA has provided valuable startup business connections with local companies. The networking socials have been valuable to develop relationships with other local people in the industry. [2]
3. Advice and mentorship. [3]
4. Help attract employees to our company and our region.[3]
5. Promote cooperation and collaboration among member companies. [3]
6. Maintaining connections to the local photonics industry & pointing opportunities our way. [4]
7. Sense of professional local community support. [5]
8. MPIA provides a very important unified “community” voice on subjects such as the importance of optics and photonics in Montana and the importance of university education and research to this community. [6]
9. MPIA provides an extremely helpful mechanism for connecting university researchers with local companies and for building and maintaining relationships. [6]
10. Network opportunities [7]
11. Sense of the photonics industry direction [7]
12. Recruiting potentials [7]
13. Benchmarking [7]
14. Contacts with government decision-makers [7]
15. Increased profile for our business [7]
16. Sense of community, potential to share resources [8]

17. Local branding and a way to socialize /collaborate with members, and a way to advertise for new hires. [9]
18. We have not taken advantage of this organization as of yet. [10]
19. Community. [12]
20. Support, alliance, information. [13]
21. resources, networking, clients [14]
22. unknown [15]
23. Primarily an avenue for recruitment of candidates from outside MT. Also, a method of meeting, communication, discussion and liaison between the BZN related companies. [16]
24. A Connection to companies in a similar industry. Abilities to share best practices, ideas and some resources. [17]
25. The networking and sharing of ideas/information between companies about just general day to day business has been good. Its great to see the upcoming marketing train [18]
26. valuable interactions with others in the laser community that potentially lead to fruitful collaborations [19]
27. Regarding the questions on MPIA value and priorities – The current direction, activities and priorities of MPIA are well aligned with providing the most value to our organization. [20]
28. MPIA brings networking opportunities. These networking opportunities help our organization understand which segments of the photonics markets are doing well so that we can plan actions with more insight. Also, they allow us to link up and assist each other with marketing efforts, ie trade shows and website links to promote search engine optimization. [21]
29. Helpful seminars (REO optics and the upcoming Marketing seminar) [22]
30. Create awareness of and attraction to the high tech industry in Montana [22]
31. Opportunity to network with others, find opportunities for cooperation, and shared resources [23]
32. Finding employees [23]
33. Encouraging “best & brightest” to study at MSU so we can hire them as interns and later employees [23]

34. Creating awareness of MT photonics makes it easier to attract top talent to this area [23]
35. Dissemination of information that we otherwise might miss. [25]
36. I think the marketing workshop in June will be important to our company. Technical marketing is our weak link. [25]

B. What are the top three things that the Montana Photonics Industry Alliance could do over next three years that would benefit your organization?

1. Assist in state level lobbying (drone bills, etc.), assist in seeking out state and local grants and incentives to build our company here, help to sponsor local events/expos that highlight Bozeman/MT's photonics industry to outside companies. [1]
2. Continue to pursue an optical technician training program [2]
3. Continued advice and mentorship.[3]
4. Continued national exposure of Montana Photonics. [3]
5. Continued ~quarterly presentations like REO. [3]
6. Keep the socials going [4]
7. Point appropriate opportunities our way [4]
8. Maintain job listing. [4]
9. Industry visibility, State lobbying, local technical meetings [5]
10. Help educate the Montana Legislature about the need for state support for graduate education and research; [6]
11. Help promote publicity for the Montana optics community so that we can recruit more and better graduate students; [6]
12. Provide regular opportunities for strengthening and maintaining our relationships between the university and industry. [6]
13. Support ways to improve our educational systems to increase the flow of an appropriately educated workforce. [7]
14. Promote the Gallatin Valley as a photonics cluster improving national and international perceptions that we are a viable location for high-tech, clean business. [7]
15. Continue to support networking opportunities. [7]

16. Offer seminars for compliance, marketing, international sales. [8]
17. Help with recruiting [8]
18. Hiring / webpage [9]
19. Local functions [9]
20. Branding for Montana and photonics [9]
21. Access to grant \$ for R&D and Marketing. [12]
22. Support getting the MT tech companies in 1 area at Photonics West; support the Gallatin College effort for tech training; [13]
23. help finance trade shows, continue to provide networking opportunities, provide access to free professional resources - tech writers, web developers for consultation, quickbooks experts [14]
24. A centralized compiled list of the resources and events available on line and kept up to date - a "members only" area on the website. It would list resources and upcoming events and news of interest. [14]
25. Encourage Gallatin College to offer a 2 year Electronics Technician degree
26. Encourage Gallatin College to offer a 2 year Electronics Technician degree [15]
27. Continue to optimize the website as a Showcase of the high tech based companies in the Gallatin Valley. [16]
28. Possibly open up the realm of the MPIA to include other high tech (but not optics related) groups and companies? This is more a suggestion for discussion than a "request". [16]
29. Get our support companies involved, e.g. vendor appreciation day. Machine shops, JE Soares, Wavelength Electronics, etc. Without these companies we would not have the level of success we have seen. [16]
30. Continue to assist in finding people, helping the training effort in Montana, continue to promote Montana as photonics hub within the industry [17]
31. Any possibility of group rates from suppliers e.g. ThorLabs or other optics suppliers? [19]
32. Get more employees at organizations involved to broaden the network [21]
33. Be a resource to explain if any state research or investment funding is available [21]

34. Create a website which has message board features for the community [21]
35. Launch and continually improve an ongoing campaign to bring international awareness to the innovative photonics industry in MT. This will help in attracting and hiring the best talent worldwide when our candidates already have some knowledge about our exciting technical community. This will also help in sales as customers gain awareness and recognition of technical authority that MT companies have. Advertise in places such as Photonics Spectra, Review of Scientific Instruments with a professional marketing company to accomplish this. [22]
36. Hire a “technology connector” who works on behalf of the photonics companies represented by MPIA. His/her job is to meet with and understand our respective technologies and direction, and then go out into industry and make connections, find opportunities, do market research, turn-over rocks. This would have to be a very talented person, with a high-level of technical understanding in physics and photonics as well as a business sense and very good communication skills, but if such a person could be found, they could bring tremendous value to our industry. If successful, such a person would find new opportunities, which would cost \$ which leads to 4. [22]
37. Establish a matching dollar fund for new technology that creates new jobs in MT. Give preference to the companies that have a track record for creating products that successfully meet market needs. These are the companies who have the “DNA” for wise use of \$ to create products which create long term jobs. This would help offset R&D budgets of photonics companies and help us be more aggressive in pursuing new opportunities. Keep the program lean and expect and measure results. Companies who participate could be expected to also participate as “alumni” who give back by fostering growth of new companies in some measureable ways. [22]
38. Intentionally work to create synergistic groups within the University system. For instance, if the U does not have strong component of “new materials characterization and surface science”, what could be done to create that? End result would be synergy with companies developing new technology for areas of new materials characterization and surface science, and graduates who are well positioned to create value for the photonics industry here. [22]
39. Could do a better job of being a repository of resources for things like consulting, shared resources, etc. (although this sounds nice, I really don’t have a good idea how to implement this...although the quarterly mixers definitely help just be having names matched to faces to call when something comes up) [23]
40. General training opportunities, such as the technical marketing workshop. We could not get this information by ourselves. [25]

C. Was there a new spin off company for your technology in 2014? Is the spin off company located in Montana?

As summarized in section VI above, all but two of the responses to this question were simply “no.” All of the relevant information is provided in section VI.