Montana Bioscience Cluster Revisited

Montana BioScience Alliance Strategic Plan Information Update

A Report to the Montana BioScience Alliance and
the Montana Governor's Office of Economic Development

Prepared By:
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Strategic Plan Information Update

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Introduction

The purpose of this report is to deliver a package of basic information required by the Montana BioScience Alliance (MBSA) to update its strategic operating plan. As such it focuses on two information bundles:

1. An update of the definition, composition, geography and membership of Montana's bioscience cluster; and

2. A survey and accompanying analysis to identify and prioritize key competitiveness issues, needs and opportunities of MBSA's membership base – state bioscience companies and research institutions.

The findings from these analyses will be used to affirm or modify MBSA's current member services slate to respond to its membership's most pressing needs and to inform the state in its efforts to support the Montana bioscience industry.

Background

In 2002 and 2003, as part of a larger industrial cluster project for the Governor's Office of Economic Development, RTS identified, analyzed and mapped the population of Montana's bioscience companies. As stated in the opening paragraph of the analysis, RTS found:

> Relative to the size of its economy, Montana has a substantive, relatively diverse, and growing life sciences cluster. This is true whether one takes a strict, narrowly defined view of industry or a more expansive view that includes biomedical, hospitals, and other life sciences-oriented endeavors. It is interesting to note that the existence of this cluster runs against the grain of conventional wisdom that holds that the presence of medical schools is a necessary condition for biotech cluster development. In this case, Montana has moved forward in spite of this handicap by developing its own distinctive infrastructure that includes several medical/bioscience research institutes, hospitals with research and clinical trials capacity, and a very strong life sciences and related-engineering presence and interest within its two major universities.
>
> *Innovation and Growth in Montana: The Life Sciences Cluster; RTS. 2003*

Just after the publication of this 2003 report RTS surveyed the bioscience companies it had identified during the analysis to determine their priorities for any potential initiatives the state might pursue to support their competitiveness and growth. Their number one response called for the state to lead the launch of a membership-based organization that would serve to connect them to each other, connect them to resources, and function as their activity hub.

A steering committee comprised of business, academic and technology-based economic development leaders from the bioscience community was created to lead the effort to form such an organization. As a result, the Montana BioScience Alliance (MBSA) was formed and its founding Executive Director, Sharon Peterson, engaged in the spring of 2004. Today, as it did then, its mission statement reads:

> The Montana Bioscience Alliance serves as a hub for Montana's biotechnology companies, entrepreneurs, laboratories, hospitals, clinics and universities to commercialize, grow and sustain globally competitive bioscience companies — ultimately to create high-quality jobs and economic opportunity in Montana.

Since that time the MBSA, supported by Governor's Office of Economic Development (GOED) funds, membership dues and an EDA grant, has continued to develop and grow in size and stature. Its activities and those of the GOED marketing program have generated a national bioscience industry profile for Montana while providing value to its members. By way of example, the second most pressing "action need" from the initial survey of Montana bioscience companies was for a state-based SBIR/STTR match program for help them with their early stage funding. This action subsequently became a major MBSA initiative. With the strong support of Governor Schweitzer and GOED this initiative has been enacted as law.

Updating the Montana Bioscience Cluster

Description

As mentioned above, the initial analysis for Montana's bioscience cluster was performed in 2002-03 and was based on what was then the most recent data from the year 2000. Since that time, the conventionally accepted Biotechnology Industry Organization (BIO) industry definition, like the industry itself, has changed and expanded a good bit…. and it continues to do so. The dominant definition over the last several years (and the one featured in most bioscience industry analyses) was developed for BIO by Battelle. This NAICS-based definition is comprised of 27 industries (see Appendix A) at the 6-digit NAICS level distributed across 4 subsectors: 1) agricultural feedstock and chemicals, 2) drugs and pharmaceuticals, 3) medical devices and equipment, and 4) research, testing and medical labs. In June of 2012, Battelle/BIO released a new bioscience industry definition that adds a 5th subsector – Bioscience Related Distribution that includes 3 more industries: Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers Drugs and Druggists' Sundries Merchant Wholesalers, and Farm Suppliers Merchant Wholesalers. Additionally, the new definition drops 4 industries included in the old definition: Diagnostic Imaging Centers, Dental Laboratories, Ophthalmic Goods Manufacturing, and All Other Basic Organic Chemical Manufacturing.

This analysis relies on the new Battelle/BIO definition with two modifications. First, it includes All Other Basic Organic Chemical Manufacturing. The industry includes some types of bio-fuels development and production companies as well as companies designing and producing natural food supplements, etc. In Montana's case these kinds of companies have a well-established presence in the state's life sciences landscape and are certainly as much a part of its ag-biotech culture as ethyl alcohol manufacturing or cellulosic organic fiber manufacturing (both of which are included in this definition) is in other states. The second departure from the newly minted Battelle/BIO approach is that this analysis' definition does not include the new distribution subsector. It is more tightly focused on the traditional perspective of improving the fortunes of companies that use biological systems and living organisms to produce commercial products and services. While the distribution dimension could certainly be counted as definitional element within any expanded notion of a biotech cluster or industry, it is not part of the value-creating core that is the subject of this overall strategy. Additionally, because this subsector is so large, its employment and establishment numbers when added to the mix swamp the cluster numbers and metrics and obfuscate the composition of the cluster's core value-creating bioscience companies, products, services and R&D activities. According to the newly released *Battelle/BIO State Bioscience Industry Development 2012* report, the newly added Bioscience-Related Distribution subsector

represents 53% (1,307) of total Montana life sciences industry employment and 62% (219) of the total number of establishments within the industry.

It is also important to note, the products, services, and firms that define the bioscience industry are very diverse and constantly changing and they do not lend themselves to a crisp definition with clearly delineated boundaries. Because of this, there may well be some firms that should be legitimately counted as bioscience firms that are not included in our count because they are in NAICS codes not included in the current definition and, just as likely, there may some firms counted within the 6-digit NAICS codes bioscience definition that are not really bioscience firms. In spite of its conceptual drawbacks, this is the conventionally accepted and most workable definition for this industry within the US and allows for comparison to other states and national norms.

As a final definitional consideration, it should be noted that hospitals are not included in the BIO bioscience industry definition though occasionally they are included in industry definitions in other life science cluster analyses. They are typically excluded because hospitals are primarily engaged in patient care and not in the use of biological systems and living organisms to make or derive commercial products and services. Also, as was the case with the bioscience distribution subsector, their employment numbers when added to the mix conceal the dynamics (or lack thereof) of the cluster's core value-creating bioscience companies, products, services and R&D activities. On the other hand, hospitals can play an important role in a bioscience cluster when they are actively engaged in clinical trials and their own research. In view of these circumstances, as a point of information, this Montana bioscience cluster description while focusing on the conventional BIO definition will also offer a quick look at the cluster when hospitals (general and surgical, psychiatric and substance abuse, and specialty) are included.

Composition

Table 1 offers an overview of the Montana bioscience cluster as of 2011 using the above-described bioscience industry definition. Three attributes of the Montana bioscience cluster are immediately evident.

1. The cluster is propelled by a lot of small companies. The employment location quotient (LQ) of .41 indicates that the concentration of bioscience employment within the Montana overall economy is less than half of the bioscience employment concentration level within the US economy. However, establishment LQ of .95 is right at the national concentration level and over twice the value of the employment LQ.

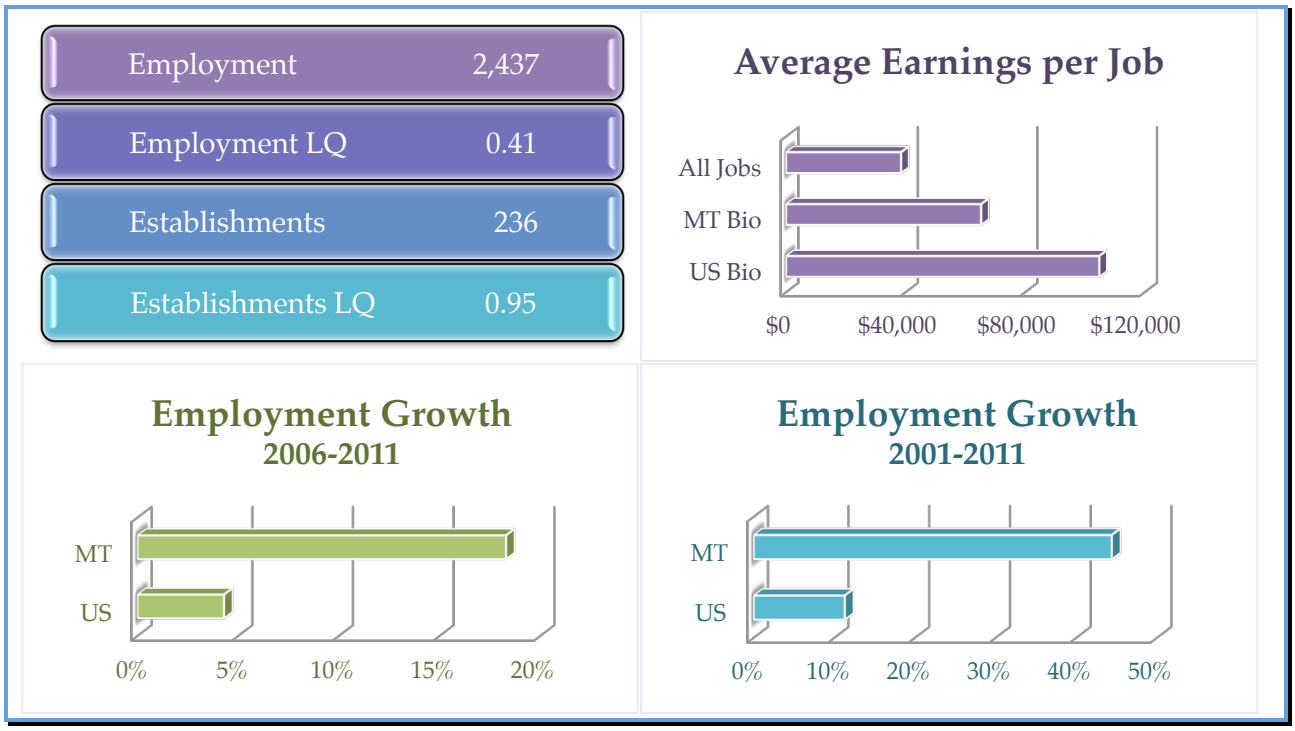
2. The average earnings per job within the Montana bioscience industry ($65,317) is 70% higher than the average earnings per job within the overall Montana economy ($38,533) but 60% lower than the average earnings per job with the US

bioscience industry ($104,839). These numbers aren't particularly surprising when taking into account the higher wage and salary STEM occupations within bioscience industry counterbalanced by the fact that this cluster is defined by its large number of small companies that tend to pay smaller salaries than the large bioscience-related corporations and Montana's historical position as a lower wage state.

3. The employment growth rate for the Montana bioscience cluster was substantially above the national bioscience industry growth rate for both periods examined. The initial Montana bioscience cluster study (2002) used data from the year 2000. For the ensuing years (2001-2011), Montana bioscience cluster employment grew four times faster than employment within the US bioscience industry as a whole.

4. The same is true for the 2006-2011 that reflects more directly the impact of the recession – Montana's bioscience employment still grew four times faster than the nation as a whole.

Table 1: Montana Bioscience Cluster at a Glance



Source: Economic Modeling Specialists, Intl. (EMSI) and RTS, 2012.

Table 2 presents an industry-by-industry breakdown for the Montana bioscience cluster at the six-digit NAICS level. There were five bioscience industry categories with above average employment concentrations compared to the US bioscience industry. They were:

- All Other Basic Organic Chemical Manufacturing
- Nitrogenous Fertilizer Manufacturing
- Medical and Botanical Manufacturing
- Biological Product (except Diagnostic) Manufacturing
- Dental Equipment and Supplies Manufacturing

The industries with the highest growth performance (all greater than 40%) for the 2001-2011 period were:

- All Other Basic Organic Chemical Manufacturing
- Medical and Botanical Manufacturing
- Biological Product (except Diagnostic) Manufacturing
- Surgical and Medical Instrument Manufacturing
- Surgical Appliance and Supplies Manufacturing
- Research and Development in Biotechnology
- Medical Laboratories

Table 2: Bioscience Cluster by NAICS Code

NAICS	Description	Employ	% Change MT 2001-11	% Change US 2001-11	Estabs	LQ 2006	LQ 2011
311221	Wet Corn Milling	0	0%	34%	0	0.00	0.00
311222	Soybean Processing	0	0%	(37%)	0	0.00	0.00
311223	Other Oilseed Processing	<10	--	(20%)	1	0.70	0.66
325193	Ethyl Alcohol Mfg	0	--	203%	0	0.45	0.00
325199	All Other Basic Org Chemical Mfg	296	160%	(13%)	5	0.87	2.48
325221	Cellulosic Organic Fiber Mfg	0	0%	(27%)	0	0.00	0.00
325311	Nitrogenous Fertilizer Mfg	60	--	(22%)	4	0.01	2.23
325312	Phosphatic Fertilizer Mfg	0	0%	(15%)	0	0.00	0.01
325314	Fertilizer (Mixing Only) Mfg	14	(77%)	(8%)	3	1.91	0.44
325320	Pesticide and Other Ag Chemical Mfg	46	(27%)	(29%)	3	0.94	0.92
325411	Medicinal and Botanical Mfg	160	--	(18%)	4	0.12	2.19
325412	Pharmaceutical Prep Mfg	20	--	(4%)	6	0.01	0.03
325413	In-Vitro Diagnostic Substance Mfg	0	0%	45%	0	0.00	0.00
325414	Bio Product (except Diagnostic) Mfg	97	41%	10%	3	0.85	1.02
334510	Electromedical & -therapeutic Apparatus Mfg	<10	--	11%	2	0.00	0.04
334516	Analytical Laboratory Instrument Mfg	14	--	(11%)	1	0.00	0.12
334517	Irradiation Apparatus Mfg	<10	--	9%	1	0.14	0.02
339112	Surgical and Medical Instrument Mfg	34	62%	10%	7	0.06	0.08
339113	Surgical Appliance and Supplies Mfg	102	108%	(1%)	12	0.14	0.28
339114	Dental Equipment and Supplies Mfg	106	(4%)	1%	4	1.97	1.78
541380	Testing Laboratories	361	(10%)	5%	47	0.81	0.65
541711	R&D in Biotechnology	136	68%	19%	24	0.19	0.26
541712	R&D in Phys, Eng, and Life Sciences (-Biotech)	771	39%	27%	84	0.44	0.46
621511	Medical Laboratories	205	59%	33%	26	0.29	0.32

SOURCE: EMSI and RTS, 2012.

In every case these seven high growth Montana bioscience industries grew at rates substantially above those industries for the nation as a whole. Two of these industry classifications, Organic Chemical Manufacturing and Medical and Botanical Manufacturing displayed high growth in employment and LQ values well above the national levels for those bioscience industries.

The bioscience industries with the highest firm counts were:

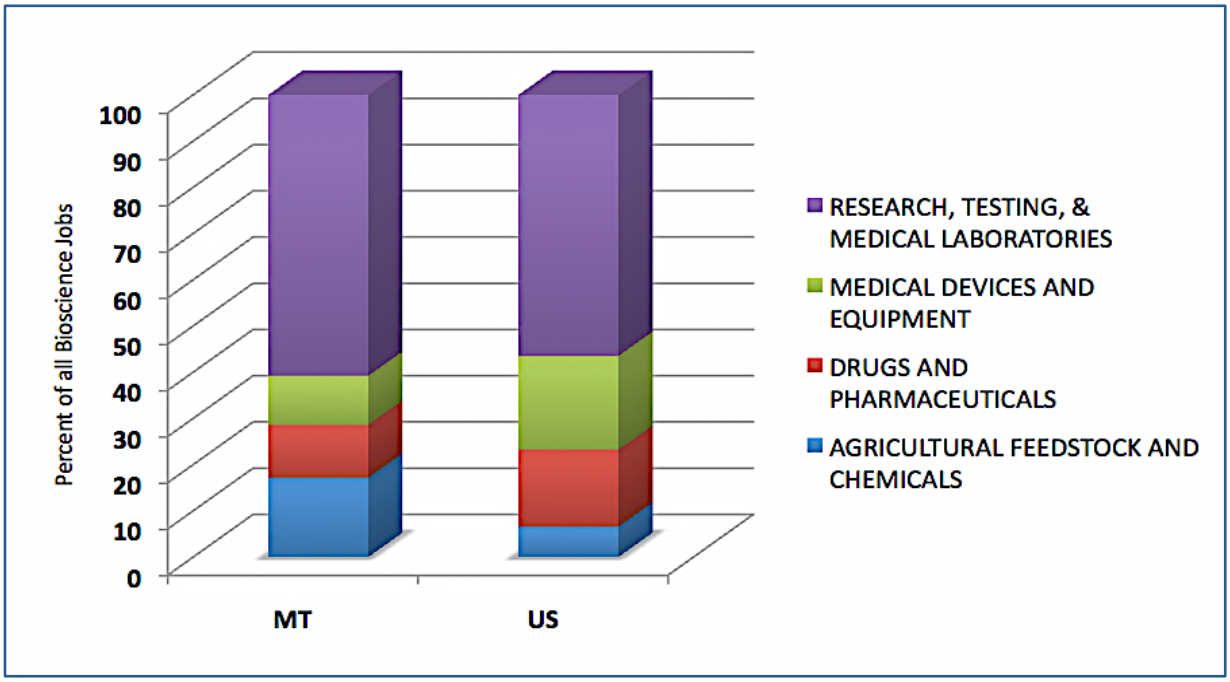
- Testing Laboratories (47)
- R&D in Biotechnology (24)
- R&D in Physical, Engineering, and Life Sciences (except Biotech) (84)
- Medical Laboratories (26)

Table 3 shows the distribution of bioscience jobs in Montana and the US across the four subsector categories; Research, Testing, and Medical Laboratories, Medical Devices and Equipment, Drugs and Pharmaceuticals, and Agricultural Feedstock and Chemicals. Montana has a higher percentage of jobs than the US in two cluster categories; Research, Testing, & Medical Laboratories and Agricultural Feedstock and Chemicals. Nearly 61% of all bioscience jobs in Montana are in the Research, Testing, & Medical Laboratories category, compared to 56.5% in the US. In the Agricultural Feedstock and Chemical category, Montana's percentage of jobs exceeds that of the US by 10.6%; 17.2% of all bioscience jobs in Montana and 6.6% in the US are in this category. Montana has a lower percentage of jobs than the US in two categories; Medical Devices and Equipment and Drugs and Pharmaceuticals. The US has 20.3% of its total bioscience jobs in the Medical Devices and Equipment category, compared to 10.6% in Montana. The US percentage of jobs in the Drugs and Pharmaceuticals category exceeds that of Montana by 5.2%; 16.6% of all bioscience jobs in the US and 11.4% in Montana are in this category.

The Hospitals

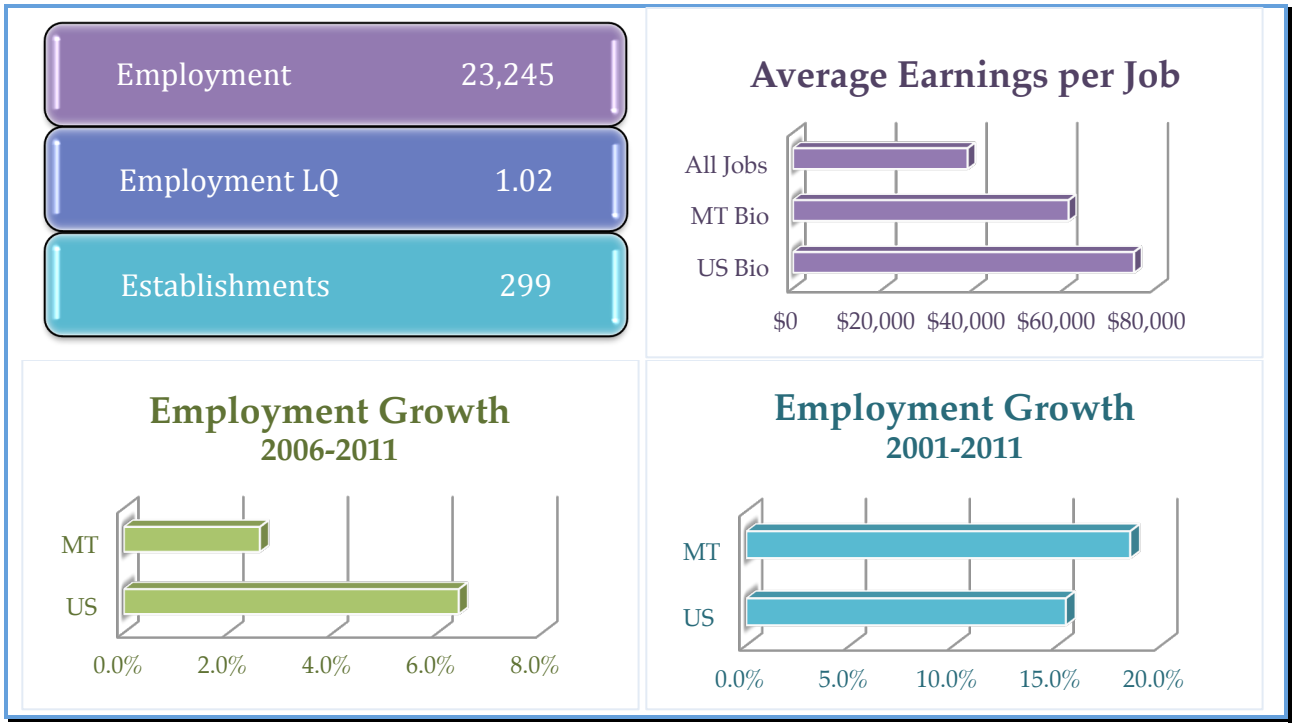
As a point of reference, the cluster figures with hospital included are presented below in Table 4. Though not typically included in core bioscience cluster definitions, hospitals can play an important role in a bioscience cluster when they are actively engaged in clinical trials and their own research. Also, as in Montana's case, these institutions can play very strong roles as advocates for the development of a bioscience cluster.

Table 3: MT vs. US Jobs by Bioscience Subsector Category



Source: EMSI and RTS, 2012.

Table 4: Montana Bioscience Cluster Including Hospitals



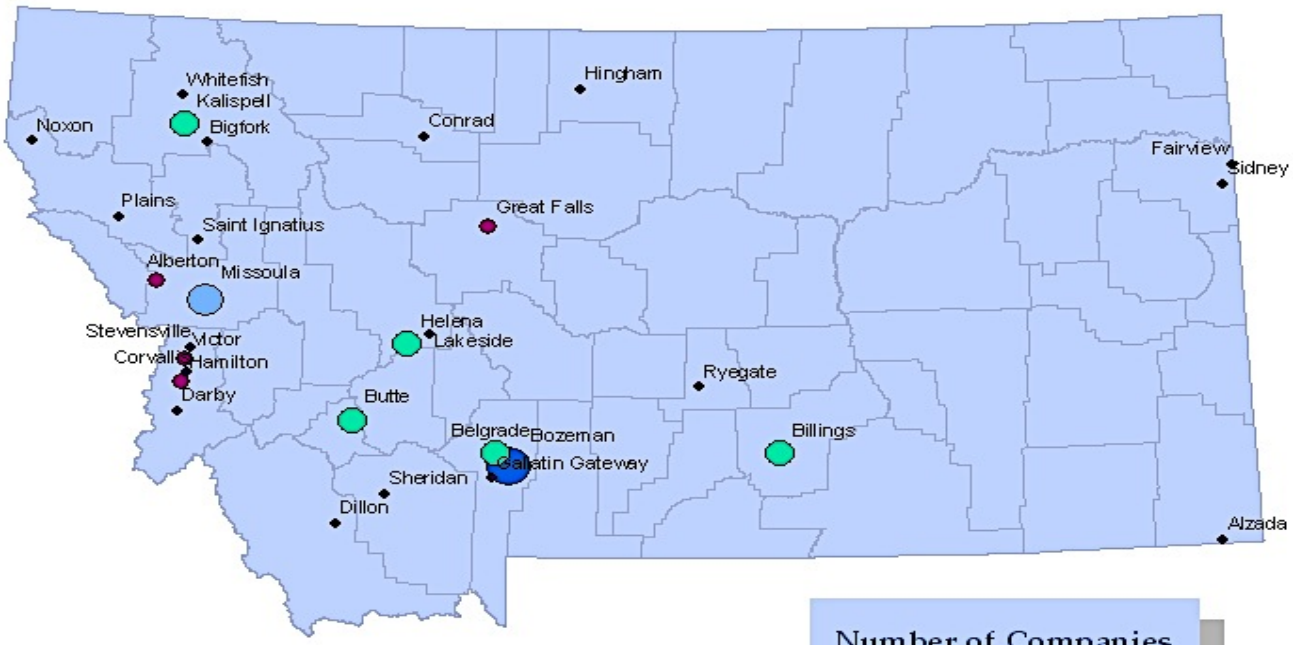
Source: EMSI and RTS, 2012.

Montana Bioscience Cluster Companies

Using the above described bioscience cluster core definition, RTS queried Hoover's (Dunn and Bradstreet) company database to generate listings of Montana-based companies within the definition's NAICS codes. Although the Hoover's database is in a state of constant flux and should not be viewed as a comprehensive source, it is the largest commercial database in the world and offers the best avenue to identity individual company listings within the definition's NAICS codes. The resulting master list was then vetted company by company to identify the subset of firms that appeared to be within or connected to the Montana bioscience industry. The resulting roster (Appendix B) was then used as the population for a web-based Montana bioscience company needs assessment survey (presented in a later section of this report) and to map the location of these companies.

The Hoover's database contained 121 listings for bioscience companies in Montana. A majority of these companies are located in and around Bozeman and Missoula, home of Montana State University and The University of Montana, respectively. Bozeman has the largest concentration of bioscience cluster companies with 33% of all Montana bioscience companies (40 companies). Twenty percent of all Montana bioscience companies are located in Missoula (24 companies) and Billings, with the third highest concentration, has 9% (11 companies). The map below provides a visual of the density of these companies throughout the state and Appendix B provides a list of these companies sorted by name and location. Appendix B also includes a table of the 11 out-of-state Montana BioScience Alliance members not charted on map below.

Montana Bioscience Companies



Source: RTS, 2012.

Bioscience Cluster Infrastructure

This segment identifies the innovation infrastructure that is already in place within Montana's bioscience cluster by taking a traditional definition of infrastructure and applying it to innovation capacity. For the purposes of this analysis then, innovation infrastructure is defined as "the public and non-profit systems, services and facilities of a region that directly enable innovation." As opposed to more general innovation infrastructure descriptions, because this effort centers explicitly on bioscience, only elements with a specific bioscience focus or elements that have existing bioscience companies in their customer based are included in the cluster infrastructure. There is a larger universe of more general hard and soft infrastructure elements also in play in Montana that is outside the scope of this analysis.

As a general rule, private assets are regarded as outside the purview of the innovation infrastructure because infrastructure elements are fundamentally public goods or in the case of non-profit organizations and public-private partnerships have a very significant public good dimension. Furthermore, in order to craft a strategy that employs these innovation infrastructure assets, their boundaries need to be identified and understood in a way that allows for specific investment and specific roles. However, there may be some circumstances in which private for-profit entities should logically be included because their commercial activities embody a strong public good dimension.

This description will split the bioscience innovation infrastructure universe into two types – hard infrastructure and soft infrastructure with additional classifications under each type according to role.

Hard Innovation Infrastructure Inventory

As the name implies, this category includes tangible assets including facilities such as incubators, research and business parks, bioscience institutes and R&D labs.

Incubator Facilities

Montana Technology Enterprise Center (MonTEC)	A business and technology incubator operated by The University of Montana.	Missoula, MT
Rivalli Entrepreneurship Center (REC)	A one-stop business services facility for technical assistance, financing, and work force needs, training and development.	Hamilton, MT
TechRanch	Helps to organize and host educational programming and networking events for Montana-based entrepreneurs.	Bozeman, MT

Research and Business Parks

Montana State University Innovation Campus	Located on approximately 100 acres adjacent to Montana State University, the Innovation Campus provides services, facilities, programs and expertise to stimulate and support the growth of research and technology-based enterprises.	Bozeman, MT
TransTech Center	A high-tech business park specifically designed to support the communication, power, and workforce needs of technology based businesses and e-commerce.	Billings, MT

Bioscience Research Assets

The Center for Biofilm Engineering (CBE)	Multidisciplinary research teams develop beneficial uses for microbial biofilms and find solutions to industrially relevant biofilm problems at Montana State University.	Bozeman, MT
Center For Bio-Inspired Nano Materials (CBIN)	A multidisciplinary research and education center at MSU that focuses on utilizing and expanding our fundamental understanding of the formation and hierarchical construction of biological materials such as viruses, cells, and biominerals (bones, teeth, seashells etc.).	Bozeman, MT
Center For Structural And Functional Neuroscience (CSFN)	An NIH Center of Biomedical Research Excellence (COBRE) at The University of Montana that utilizes approaches at the interface of molecular pharmacology, synthetic chemistry, physiology, and molecular biology to advance our understanding of the central nervous system, particularly as related to protein structure and function, signaling, transport, and pathogenesis.	Missoula, MT

College Of Health Professions And Biomedical Sciences	Home to cutting-edge research and top-notch educators at The University of Montana. Degree offerings include Bachelor of Arts in Social Work, Master's of Social Work, Master's and Certificate of Public Health, Doctor of Pharmacy, Doctor of Physical Therapy, Master of Science and Doctor of Philosophy in Neuroscience, Pharmacology, and Toxicology.	Missoula. MT
Community Medical Center	146-bed hospital in Missoula, including the Rehabilitation Institute of Montana, The Montana Heart Center, a 24/7 Level III Trauma Center and the Montana Pain Institute.	Missoula, MT
Deaconess Billings Clinic Research Center	Deaconess Billings Clinic's Research Division conducts clinical research studies of human disease, new drugs and medical devices at the center's multifaceted research facility, including a 1,500 square foot commercial research test kitchen.	Billings, MT
Department Of Biomedical And Pharmaceutical Sciences	Serves as the "basic science" unit of the Skaggs School of Pharmacy at The University of Montana. With research strengths in Molecular Pharmacology, Neuroscience, Toxicology, Pharmaceutical Sciences, and Medicinal Chemistry, its faculty of about 40, oversees much of the P1- and P2-year curriculum for the professional Pharm.D. program, as well as four graduate Ph.D. programs. A strong commitment to collaborative, multidisciplinary biomedical research has led to the development of two NIH Centers of Biomedical Research Excellence and an NIH/NINDS P30 Core Laboratory that have helped make BMED one of the leading research units on campus.	Missoula, MT

Department Of Chemical And Biological Engineering (CHBE)	Prepares MSU students with the knowledge and skills to contribute to society and their profession. Both chemical and biological engineers often function as process engineers and research engineers at the graduate level. Both fields are continuing to develop as today's research efforts create exciting new opportunities. Biological engineers work in many areas: environmental engineering, materials, pharmaceuticals, Bioengineering and biomedicine.	Bozeman, MT
Energy Research Institute	An umbrella for MSU's energy research and education programs encompassing more than 170 faculty, staff and students spread across 11 university departments who are working fields such as clean-coal technology, fuel cells, wind, coal-bed methane and biofuels.	Bozeman, MT
Immunology And Infectious Disease Department	Combines expertise in the study of pathogen biology, host defense, cell biology and use of small and large animal models. Sponsors undergraduate programs in biotechnology and pre-veterinary training and Masters and Ph.D. programs at MSU that emphasize training in cell biology, genetics, immunology and infectious disease.	Bozeman, MT
International Heart Institute	Engages physicians and scientists from St. Patrick Hospital and Health Sciences Center and The University of Montana. Performs basic and clinical research on advanced cardiac procedures and the treatment of heart disease.	Missoula, MT
McLaughlin Research Institute	An independent, non-profit research organization that focuses on understanding the genetic control of normal development and disease susceptibility using the mouse as a model system.	Great Falls, MT

Montana Biotechnology Center	The center provides core services to facilitate molecular- and cell-based research in basic biological and biomedical sciences at The University of Montana and facilitates interactions between investigators and private sector enterprises in the state.	Missoula, MT
Montana Cancer Institute	Promotes the integration of research and patient care through collaborations between experts in research and clinical medicine, and through educational programs. A collaborative effort between St. Patrick Hospital and Health Sciences Center and The University of Montana.	Missoula, MT
Montana Health Research Institute	An experienced multi-therapeutic medical research facility dedicated to providing high quality Phase II, III and IV clinical trials.	Billings, MT
Montana Neuroscience Institute (MNI)	Conducts basic, translational and clinical neuroscience research and provides education to students, medical providers, and the public at The University of Montana. Serves as the organizing site for the *Montana Brain Injury Center*, a statewide consortium of healthcare providers, researchers, education/advocacy groups and government agencies.	Missoula, MT
Montana Neuroscience Institute Foundation	The Montana Neuroscience Institute Foundation (MNIF) promotes the integration of neuroscience research and patient care. Through collaboration fostered by the Foundation experts in research and clinical medicine develop innovations in patient care to help those afflicted with diseases of the nervous system.	Missoula, MT
Rocky Mountain Labs	A state-of-the-art biomedical research facility of NIH's National Institute of Allergy and Infectious Diseases.	Hamilton, MT

Sletten Cancer Institute At Benefis Healthcare	Affiliated with the Huntsman Cancer Institute in Salt Lake City, Utah and the McLaughlin Research Institute in Great Falls. Programs and services span the continuum of care, including prevention, screening, education and information programs, patient care, research and hospice care.	Great Falls, MT
Thermal Biology Institute	Conducts and promotes research and education at MSU focused on the biology and interrelated physical and chemical processes of geothermal environments in the Greater Yellowstone Ecosystem.	Bozeman, MT

Healthcare Assets

Advanced Care Hospital Of Montana	Offer long-term acute care and critical care services for patients recovering from serious illnesses or injuries.	Billings, MT
Rocky Mountain Health Network	A provider hospital organization developed to help healthcare providers work more effectively and efficiently. Today, RMHN has more than 500 member and non-member clients, including physicians, hospitals, surgery centers and ancillary providers.	Billings, MT
Shodair Children's Hospital	Shodair's medical genetics department provides genetic evaluation and counseling. The Genetics Laboratory offers specialized testing as a part of the comprehensive medical genetics program based at Shodair Children's Hospital. Services include: Microarray Analysis, Maternal Serum Screening, Cytogenetics, Fluorescence In Situ Hybridization (FISH), Molecular Diagnostics, and Drug Metabolizing Enzyme (Pharmacogenetic) testing.	Helena, MT

St. Vincent Healthcare	Comprehensive healthcare provider serving over 400,000 people in a four-state area. St. Vincent collaborates with the University of Pennsylvania School of Medicine to study congestive heart failure monitoring alternatives. Through the use of its telemedicine infrastructure, neonatal babies have access to sub-specialty services from the University of Stanford.	Billings, MT
Synaptic Healthcare	Strives to provide the knowledge and the impulses that bridge gaps in community healthcare. Integrating all the needed skills and procedures with already existing resources, they improve efficiency and lower costs.	Miles City, MT

A Soft Infrastructure Inventory

Soft infrastructure includes networks like associations, alliances, task forces and so on that allow for flow of information and enable transactions; service and technical assistance organizations with explicit innovation missions; and financial resources such as public or non-profit grant or early stage funds.

Direct Bioscience Innovation Support Organizations

Innovate Montana	A public/private partnership led by the Governor's Office of Economic Development, Innovate Montana offers a web portal that highlights Montana's emerging innovation community and provides information and resources to individuals about working, living and playing in Montana.	Helena, MT
Missoula Vaccine Partnership	A biotech partnership formed to examine whether vaccine production could become an economic driver in the state and explore the possibility of developing a regional center of excellence for vaccine production.	Missoula, MT
Missoula Associated Technology Roundtables	Provides networking and information opportunities to the entrepreneurs, investors and professionals of Montana and the Inland Northwest Region.	Missoula, MT

Montana BioScience Alliance	Serves as a hub for Montana's biotechnology companies, entrepreneurs, laboratories, hospitals, clinics and universities to commercialize, grow and sustain globally competitive bioscience companies.	Billings, MT

Public or Non-Profit Financial Resources With Bioscience Expertise and Bioscience Clients

Montana Board of Research, Commercialization & Technology	Created by the Montana Legislature to provide a predictable and stable source of funding for research and commercialization projects conducted at research and commercialization centers in Montana. Invests in research projects that have a clear path to commercialization.	Helena, MT
Montana SBIR Outreach Program	Assists businesses to become more competitive for federal research and development grant funding.	Helena, MT
Montana SBIR/STTR Matching Funds Program (MSMFP)	Provides matching funds to eligible businesses that have been awarded a Small Business Innovation Research Program or Small Business Technology Transfer Program (Federal SBIR/STTR Program) Phase I award.	Helena, MT

Risk Capital Providers

Flywheel Ventures	A seed and early stage venture capital firm with a Montana-based Venture Partner and a history of investment in Montana companies that focuses on digital services, infrastructure technology, energy technology, and water technology.	Santa Fe, NM
Frontier Angel Fund, LLC	A group of accredited investors dedicated to providing equity capital to early and mid-stage entrepreneurial companies based in western Montana, Montana, and the inland Pacific Northwest.	Polson, MT

Goodworks Ventures, LLC and Hellgate Venture Network	Montana-based venture fund that invests in early and mid-stage companies with high impact solutions to challenging problems and that show promise in their technology, scalability and management. The Hellgate Venture Network facilitates social networking both online and offline amongst entrepreneurs and advisors engaged in building growth businesses in Western Montana.	Missoula, MT
Highway 12 Ventures	Partners with promising high-growth start-up companies in the Intermountain West to build lasting, market leading companies.	Boise, ID
Montlake Capital	A growth equity firm that provides capital and actively partners with management teams to build and grow businesses to create sustainable long-term value.	Seattle, WA

The Montana BioScience Alliance Membership Base Survey

The final step in updating the Montana bioscience cluster profile was to design and deploy a short Internet-based survey to gather information on the most pressing business issues for the firms within the cluster (and thus the MBSA membership base). The findings from the survey as well as the findings from quantitative analysis and the infrastructure inventory will be used to affirm or modify MBSA's current member services slate to respond to its membership's most pressing needs and to inform the state in its efforts to support the Montana bioscience industry.

Survey Findings: Bioscience Company Respondents Group Profile

The Internet-based survey targeted a population of 99 cluster firms for which individual contact information and email addresses could be identified. Survey responses were received from 17 firms within the targeted population. The survey findings are presented below.

Company Characteristics

Size

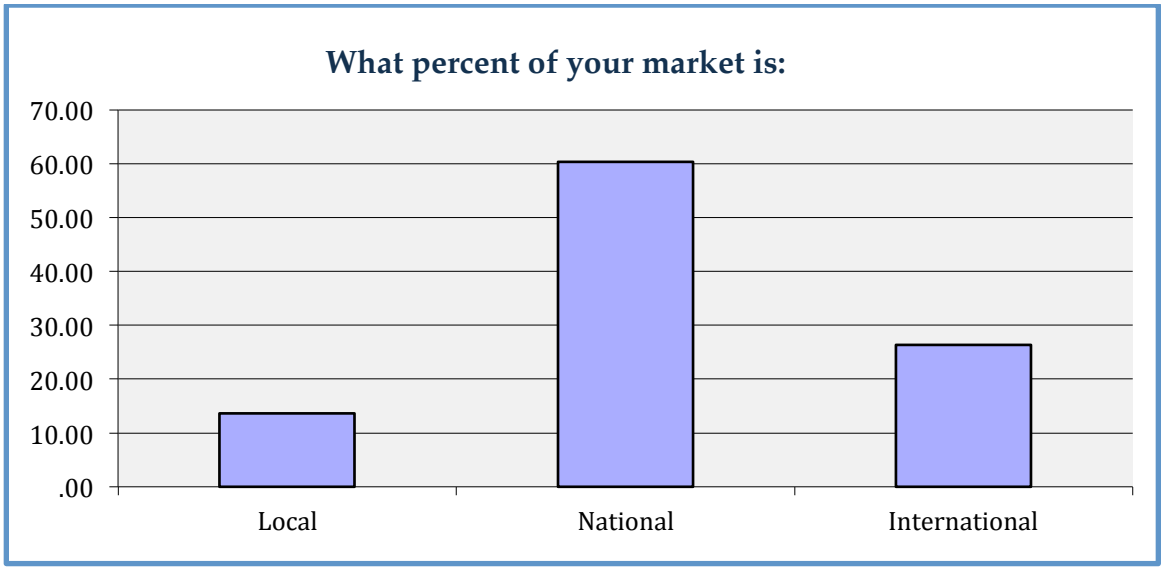
- Consistent with the quantitative scan findings, the responding group was dominated by small bioscience companies with 82% of the respondents having under 50 employees -- 47% of respondents employ 1-5 people, 35% are medium-sized companies with 6-50 employees and 18% have more than 50 employees.

Location and Density

- 13 of 17 responses (77%) were from companies in Bozeman or Missoula, MT. Of the 16 companies that listed a MT address as their location, 14 replied that it was their primary location, two of which have more than one Montana facility. Two of the 16 MT companies have locations outside of MT in the US, one of which has an international location. This is consistent with what we found when mapping the density of bioscience companies in Montana. A majority of Montana bioscience companies are located in either Bozeman or Missoula near Montana State University or University of Montana main campuses.

Market Location

- A little less than 14% of respondents market products locally, whereas over 60% market nationally. 26% have international markets.



Source: SurveyMonkey and RTS, 2012.

SBIR and Montana SBIR Matching Program

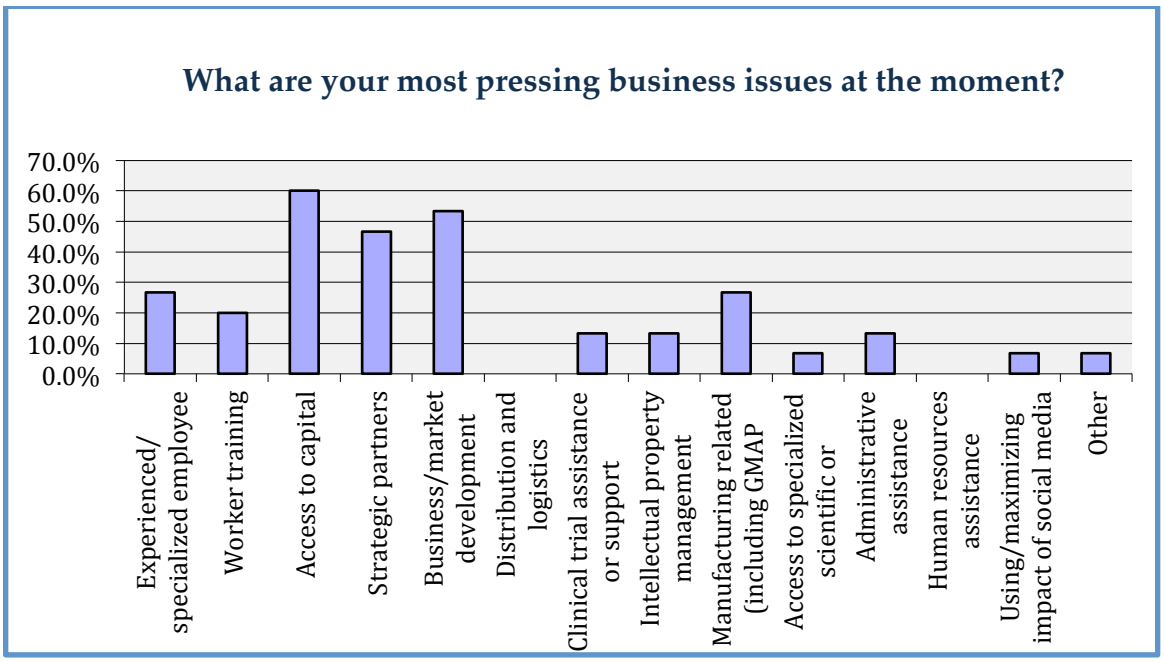
- 53% of respondents have received an SBIR grant and 59% are aware that Montana has a matching program for SBIR.

Products and Services

- The products and services offered by the respondent group reflect the overall diversity within the cluster itself. Responding companies covered a wide range of commercial endeavors including R&D for drugs, vaccines and test kits, pharmaceutical manufacturing, medical instruments, specialty chemicals, bioscience applications within industrial processes, testing laboratories, homeopathic medical products, and genetic research software.

Business Needs and Issues

The top three concerns of respondents were Access to Capital (60%), Business/Market Development (53%), and developing Strategic Partners (47%). Respondents were permitted to select more than one answer.



Source: SurveyMonkey and RTS, 2012.

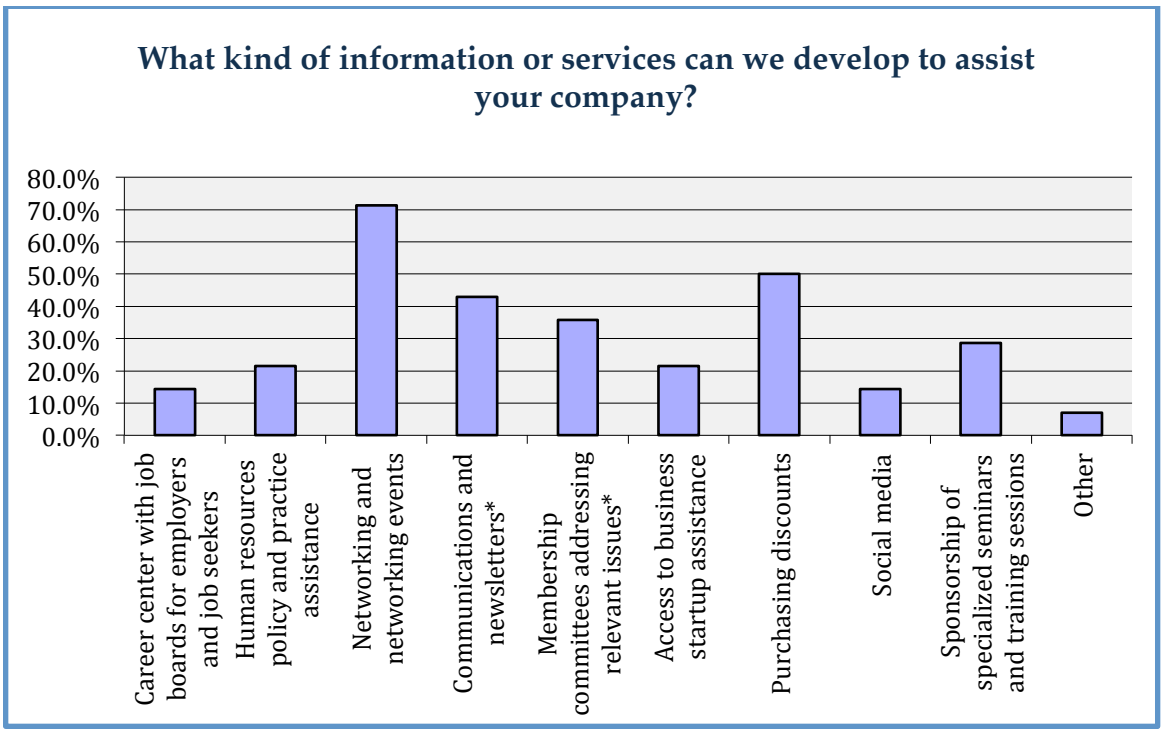
Montana BioScience Alliance Services

Suggested Montana BioScience Alliance Support Services

- 71% of respondents requested networking support from Montana BioScience Alliance. 50% suggested purchasing discounts and 43% suggested Communications and newsletters that cover scientific, business, and public policy developments and activities of interest to the MT bioscience community. Respondents were permitted to select more than one answer.

Montana BioScience Alliance Membership Interest

- 82% of respondents are interested in learning more about the benefits of being a member of the Montana BioScience Alliance. 18% are not.



Source: SurveyMonkey and RTS, 2012.
*Full title: Communications and newsletters – scientific, business, and public policy developments and activities of interest to the MT bioscience community.
**Full title: Membership committees addressing: IP management, HR, strategic partnering, clinical trials management, bio-manufacturing, bioscience-related public policy issues.

Appendix to Montana Bioscience Cluster Revisited

Montana BioScience Alliance Strategic Plan Information Update

Appendix A: Bioscience Cluster Definition

Table A-1: Bioscience Cluster NAICS Codes – Battelle Definition

Bioscience Cluster Definition(s)	
AGRICULTURAL FEEDSTOCK AND CHEMICALS	NAICS
Wet Corn Milling	311221
Soybean Processing	311222
Other Oilseed Processing	311223
Ethyl Alcohol Manufacturing	325193
All Other Basic Organic Chemical Manufacturing	325199
Cellulosic Organic Fiber Manufacturing	325221
Nitrogenous Fertilizer Manufacturing	325311
Phosphatic Fertilizer Manufacturing	325312
Fertilizer (Mixing Only) Manufacturing	325314
Pesticide and Other Agricultural Chemical Manufacturing	325320
DRUGS AND PHARMACEUTICALS	
Medicinal and Botanical Manufacturing	325411
Pharmaceutical Preparation Manufacturing	325412
In-Vitro Diagnostic Substance Manufacturing	325413
Biological Product (except Diagnostic) Manufacturing	325414
MEDICAL DEVICES AND EQUIPMENT	
Electromedical and Electrotherapeutic Apparatus Manufacturing	334510
Analytical Laboratory Instrument Manufacturing	334516
Irradiation Apparatus Manufacturing	334517
Surgical and Medical Instrument Manufacturing	339112
Surgical Appliance and Supplies Manufacturing	339113
Dental Equipment and Supplies Manufacturing	339114
Ophthalmic Goods Manufacturing	339115
Dental Laboratories	339116
RESEARCH, TESTING, & MEDICAL LABORATORIES	
Testing Laboratories	541380
Research and Development in Biotechnology	541711
Research and Development in the Physical, Engineering & Life Sciences (except biotech)	541712
Medical Laboratories	621511
Diagnostic Imaging Centers	621512
NOT INCLUDED IN BIO DEFINITION	
General Medical and Surgical Hospitals	622110
Psychiatric and Substance Abuse Hospitals	622210
Specialty (except Psychiatric and Substance Abuse) Hospitals	622310

Source: RTS, 2012.

Appendix B: Montana Bioscience Companies & Out-of-State Montana BioScience Alliance Members

Table B-1: Montana Bioscience Companies Alphabetized

	Company	City
1	Aaanalogues, LLC	Alberton
2	ACP International, LLC (Acute Care Pharmaceuticals)	Belgrade
3	AdvR, Inc.	Bozeman
4	Agmor, Inc.	Belgrade
5	All American Pharmaceutical / Squibb Laboratories	Billings
6	American Eagle Instruments Inc.	Missoula
7	Arcadis U.S., Inc.	Helena
8	Arctos Research, LLC	Plains
9	Aspen Orthotics & Prosthetics	Hamilton
10	Ateris Technologies LLC Bozeman	Bozeman
11	Ateris Technologies LLC Missoula	Missoula
12	Bacterin International, Inc.	Belgrade
13	Belport Company Inc. / Gingi-Pak	Darby
14	Big Sky Imaging Consultants, LLC	Billings
15	Bighorn Botanicals, Inc.	Noxon
16	Bio Pred, LLC and Bozeman Medical Imaging, LLC	Billings
17	Bio-Energy Systems, Inc.	Kalispell
18	Biografts Inc.	Bozeman
19	Biomet Orthopedics	Billings
20	BioScience Laboratories Incorporated	Bozeman
21	BioSurface Technology Corporation	Bozeman
22	BLIMP Pharmaceuticals	Corvallis
23	Blue Marble Biomaterials	Missoula
24	Bridger Photonics, Inc.	Bozeman
25	Bridger Technologies, Inc.	Bozeman
26	Center For Innovation, Inc.	Butte
27	Christensen Research LP	Missoula
28	Conservation Biology Research	Missoula
29	Dikaryon Biotechnologies Limited	Missoula
30	Elkhorn Mountain Cytology	Helena
31	Emerald Bioagriculture Corp	Butte

	Company	City
32	Endo Biologics, Inc.	Missoula
33	Energy Laboratories, Inc. Billings	Billings
34	Energy Laboratories, Inc. Helena	Helena
35	Ethanext Energy Development, LLC	Helena
36	Fluorescence Innovations	Bozeman
37	Gametrics Ltd	Alzada
38	Genectar Com, LLC	Whitefish
39	GeneSearch, Inc.	Bozeman
40	Glacier Cross Inc.	Kalispell
41	Golden Helix, Inc.	Bozeman
42	Gray Matter Research, LLC	Bozeman
43	Green OXY Fuels, LLP	Belgrade
44	GSK Biologicals	Hamilton
45	GT Neuropharma	Missoula
46	Hanger Prosthetics & Orthotics Billings	Billings
47	Hanger Prosthetics & Orthotics Butte	Butte
48	HI Line Fertilizer, Inc.	Hingham
49	I T I, Inc.	Missoula
50	Infectious Disease Specialists, PC	Missoula
51	Informed Bioscience	Bozeman
52	J & R Enterprises, Inc. / Neuro 7	Billings
53	John Balsam Associates, LLC	Missoula
54	KCI Medclaim	Dillon
55	Legacy Bioscience LLC	Bozeman
56	Ligocyte Pharmaceuticals, Inc.	Bozeman
57	Loveland Products, Inc.	Billings
58	M.J. Winship	Bozeman
59	Materials Bio Inc. / Quad Five	Ryegate
60	Microbion Corporation	Bozeman
61	Montana Advanced Biofuels, LLC	Great Falls
62	Montana Aromatics	Stevensville
63	Montana Bioresources Inc.	Bozeman
64	Montana Biotech Corp.	Belgrade
65	Montana Environmental Laboratory, LLC	Kalispell
66	Montana Heart Center Cardiology, PLLC	Missoula

	Company	City
67	Montana Medical Research Inc.	Missoula
68	Montana Molecular, LLC	Bozeman
69	Montana Plant Food Inc.	Conrad
70	Mortan Inc.	Missoula
71	Mortech LLC	Missoula
72	MPA Technologies Inc.	Bozeman
73	MSE Technology Applications Inc.	Butte
74	Nanomed Technologies, LLC	Bozeman
75	Nanovalent Pharmaceuticals, Inc.	Bozeman
76	Nervonix	Bozeman
77	Neuralynx	Bozeman
78	Neurogenic Technologies Inc.	Missoula
79	Norion Diagnostics	Bozeman
80	Northern Plains Pathologists	Great Falls
81	Nurture, Inc.	Missoula
82	Nutritional Laboratories International, Inc.	Missoula
83	Omega Biologicals Inc.	Bozeman
84	OncoPharmacia	Bozeman
85	Paul Ray	Sheridan
86	Promiliad Biopharma Incorporated	Alberton
87	Propharma Group	Bozeman
88	Pyron Technologies	Missoula
89	Quantel Medical	Bozeman
90	Quantel USA	Bozeman
91	R D Water Lab, LLC	Missoula
92	Rasiris Inc.	Bozeman
93	Resodyn Corporation	Butte
94	Resonon	Bozeman
95	Rivertop Renewables	Missoula
96	Rocky Mountain Biologicals	Missoula
97	Rocky Mountain Pharma	Bozeman
98	Safflower Technologies Intl, LLC Fairview	Fairview
99	Safflower Technologies Intl, LLC Sidney	Sidney
100	Saje Pharma, LLC	Kalispell
101	Salient Technologies Inc.	Bozeman

	Company	City
102	Scentry Biologicals, Inc.	Billings
103	Sensopath Technologies, Inc.	Bozeman
104	SGM Biotech, Inc.	Bozeman
105	SiMatrix	Victor
106	Sinapis Pharma	Missoula
107	Sleeping Giant Biodiesel	Helena
108	SMK Plants	Billings
109	Snider Technology Inc.	Bozeman
110	Specialty Biopolymers Corporation	Bozeman
111	Specialty Surgical Products, Inc.	Victor
112	Summit Corporate Services, Inc.	Bozeman
113	Swan Valley Medical, Inc.	Bigfork
114	T 4 Corporation	Missoula
115	Transynaptic Technologies, LLC	Missoula
116	US Dental Corp.	Lakeside
117	VWR International	Missoula
118	Wadsworth Manufacturing, Inc.	Saint Ignatius
119	WestBred	Bozeman
120	Windstone Medical Packaging, Inc.	Billings
121	Zyde, LLC	Gallatin Gateway

Source: RTS, 2012.

Table B-2: Montana Bioscience Companies by Location

	Company	City
1	Promiliad Biopharma Incorporated	Alberton
2	Aaanalogues, LLC	Alberton
3	Gametrics Ltd	Alzada
4	Montana Biotech Corp.	Belgrade
5	Bacterin International, Inc.	Belgrade
6	Green OXY Fuels, LLP	Belgrade
7	ACP International, LLC (Acute Care Pharmaceuticals)	Belgrade
8	Agmor, Inc.	Belgrade
9	Swan Valley Medical, Inc.	Bigfork
10	J & R Enterprises, Inc. / Neuro 7	Billings
11	Hanger Prosthetics & Orthotics	Billings
12	Bio Pred, LLC and Bozeman Medical Imaging, LLC	Billings
13	SMK Plants	Billings
14	Big Sky Imaging Consultants, LLC	Billings
15	All American Pharmaceutical / Squibb Laboratories	Billings
16	Energy Laboratories, Inc. Billings	Billings
17	Loveland Products, Inc.	Billings
18	Biomet Orthopedics	Billings
19	Scentry Biologicals, Inc.	Billings
20	Windstone Medical Packaging, Inc.	Billings
21	WestBred	Bozeman
22	Norion Diagnostics	Bozeman
23	Montana Bioresources Inc.	Bozeman
24	Rocky Mountain Pharma	Bozeman
25	Quantel USA	Bozeman
26	Specialty Biopolymers Corporation	Bozeman
27	Bridger Technologies, Inc.	Bozeman
28	Nervonix	Bozeman
29	Salient Technologies Inc.	Bozeman
30	BioSurface Technology Corporation	Bozeman
31	Omega Biologicals Inc.	Bozeman
32	Rasiris Inc.	Bozeman
33	MPA Technologies Inc.	Bozeman
34	Snider Technology Inc.	Bozeman

	Company	City
35	Quantel Medical	Bozeman
36	Sensopath Technologies, Inc.	Bozeman
37	BioScience Laboratories Incorporated	Bozeman
38	Informed Bioscience	Bozeman
39	Ligocyte Pharmaceuticals, Inc.	Bozeman
40	Nanovalent Pharmaceuticals, Inc.	Bozeman
41	Microbion Corporation	Bozeman
42	Summit Corporate Services, Inc.	Bozeman
43	Golden Helix, Inc.	Bozeman
44	Gray Matter Research, LLC	Bozeman
45	Ateris Technologies LLC Bozeman	Bozeman
46	GeneSearch, Inc.	Bozeman
47	Montana Molecular, LLC	Bozeman
48	AdvR, Inc.	Bozeman
49	Biografts Inc.	Bozeman
50	Neuralynx	Bozeman
51	Fluorescence Innovations	Bozeman
52	Resonon	Bozeman
53	Bridger Photonics, Inc.	Bozeman
54	SGM Biotech, Inc.	Bozeman
55	M.J. Winship	Bozeman
56	Propharma Group	Bozeman
57	Nanomed Technologies, LLC	Bozeman
58	OncoPharmacia	Bozeman
59	Legacy Bioscience LLC	Bozeman
60	Resodyn Corporation	Butte
61	Hanger Prosthetics & Orthotics	Butte
62	Center For Innovation, Inc.	Butte
63	MSE Technology Applications Inc.	Butte
64	Emerald Bioagriculture Corp	Butte
65	Montana Plant Food Inc.	Conrad
66	BLIMP Pharmaceuticals	Corvallis
67	Belport Company Inc. / Gingi-Pak	Darby
68	KCI Medclaim	Dillon
69	Safflower Technologies Intl, LLC Fairview	Fairview

	Company	City
70	Zyde, LLC	Gallatin Gateway
71	Montana Advanced Biofuels, LLC	Great Falls
72	Northern Plains Pathologists	Great Falls
73	GSK Biologicals	Hamilton
74	Aspen Orthotics & Prosthetics	Hamilton
75	Energy Laboratories, Inc. Helena	Helena
76	Elkhorn Mountain Cytology	Helena
77	Arcadis U.S., Inc.	Helena
78	Sleeping Giant Biodiesel	Helena
79	Ethanext Energy Development, LLC	Helena
80	HI Line Fertilizer, Inc.	Hingham
81	Glacier Cross Inc.	Kalispell
82	Saje Pharma, LLC	Kalispell
83	Bio-Energy Systems, Inc.	Kalispell
84	Montana Environmental Laboratory, LLC	Kalispell
85	US Dental Corp.	Lakeside
86	Montana Medical Research Inc.	Missoula
87	Mortech LLC	Missoula
88	Neurogenic Technologies Inc.	Missoula
89	I T I, Inc.	Missoula
90	Nutritional Laboratories International, Inc.	Missoula
91	Mortan Inc.	Missoula
92	Endo Biologics, Inc.	Missoula
93	Sinapis Pharma	Missoula
94	Rocky Mountain Biologicals	Missoula
95	Transynaptic Technologies, LLC	Missoula
96	Ateris Technologies LLC Missoula	Missoula
97	GT Neuropharma	Missoula
98	VWR International	Missoula
99	Rivertop Renewables	Missoula
100	John Balsam Associates, LLC	Missoula
101	Christensen Research LP	Missoula
102	Montana Heart Center Cardiology, PLLC	Missoula
103	Dikaryon Biotechnologies Limited	Missoula
104	Nurture, Inc.	Missoula

	Company	City
105	R D Water Lab, LLC	Missoula
106	T 4 Corporation	Missoula
107	American Eagle Instruments Inc.	Missoula
108	Conservation Biology Research	Missoula
109	Pyron Technologies	Missoula
110	Infectious Disease Specialists, PC	Missoula
111	Blue Marble Biomaterials	Missoula
112	Bighorn Botanicals, Inc.	Noxon
113	Arctos Research, LLC	Plains
114	Materials Bio Inc. / Quad Five	Ryegate
115	Wadsworth Manufacturing, Inc.	Saint Ignatius
116	Paul Ray	Sheridan
117	Safflower Technologies Intl, LLC Sidney	Sidney
118	Montana Aromatics	Stevensville
119	Specialty Surgical Products, Inc.	Victor
120	SiMatrix	Victor
121	Genectar Com, LLC	Whitefish

Source: RTS, 2012.

Table B-3: Out-of-State Montana BioScience Alliance Members

	Company	City
1	Amgen	Seattle, WA
2	Fisher Scientific	Pittsburgh, PA
3	Innovative Laboratory Systems Inc.	Rockford, MN
4	Johnson & Johnson	Denver, CO
5	Medimunne Biologics, Inc.	Gaithersburg, MA
6	Merck Sharp & Dohme	Whitehouse Station, NJ
7	Northwest Biotechnology Company	Anchorage, AK
8	Pfizer	New York, NY
9	Pharmaceutical Research and Manufacturers of America	Washington, DC
10	The Jon Block Group	San Francisco, CA
11	US Bioremediation, Inc.	Salt Lake City, UT

Source: RTS, 2012.

Appendix C: Bioscience Company Survey Instrument

Montana Biosciences

Montana BioScience Alliance (MBSA) Survey

In spite of the downturn in the US economy, the bioscience sector is alive and well in Montana. During the five-year period from 2005 to 2010, Montana's bioscience company employment outdistanced the bioscience sector growth in the national economy by a whopping 17% (22% for Montana, 5.9% for the US).

Since 2004 the Montana BioScience Alliance (MBSA) has worked to support the growth and competitiveness of the State's biotechnology companies, entrepreneurs, laboratories, hospitals, clinics and universities. Now to assure that it will continue to provide high impact value to Montana's bioscience cluster and to its membership, with the support of the Governor's Office of Economic Development, MBSA is updating its strategic plan as well as its slate of member services. Your company has been flagged as an organization that might have a direct interest in the fortunes and development of Montana's biotech industry. If you are interested, we would like to ask you a few questions about your company so we can figure out how the Alliance might be able to assist you and organizations like yours.

Please note this survey guarantees respondent confidentiality. Findings are only reported at an aggregate level, not on an individual basis.

1. Company Name

2. Contact Person

3. Where are you located?

4. Is this your company's primary location?

- ○ Yes
- ○ No

5. Does your company have other locations? Please select all that apply.

- ☐ Yes, In Montana
- ☐ Yes, Outside of Montana in the US
- ☐ Yes, Outside of the US
- ☐ No

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Montana Biosciences

6. Approximately how many employees do you have?

- 1-5
- 6-20
- 21-50
- 50-100
- Over 100

7. What are your products or services OR planned products and services?

8. What percent of your market is:

Local	
National	
International	

Montana Biosciences

9. What are your most pressing business issues at the moment? You can select more than one answer.

- ☐ Experienced/specialized employee recruitment
- ☐ Worker training
- ☐ Access to capital
- ☐ Strategic partners
- ☐ Business/market development
- ☐ Distribution and logistics
- ☐ Clinical trial assistance or support
- ☐ Intellectual property management
- ☐ Manufacturing related (including GMAP access)
- ☐ Access to specialized scientific or engineering expertise
- ☐ Administrative assistance
- ☐ Human resources assistance
- ☐ Using/maximizing impact of social media
- ☐ Other

Other (please specify)

Montana Biosciences

10. What kind of information or services can we develop to assist your company? You can select more than one answer.

- ☐ Career center with job boards for employers and job seekers
- ☐ Human resources policy and practice assistance
- ☐ Networking and networking events
- ☐ Communications and newsletters – scientific, business, and public policy developments and activities of interest to the MT bioscience community
- ☐ Membership committees addressing: IP management, HR, strategic partnering, clinical trials management, bio-manufacturing, bioscience-related public policy issues
- ☐ Access to business startup assistance
- ☐ Purchasing discounts
- ☐ Social media
- ☐ Sponsorship of specialized seminars and training sessions for members
- ☐ Other

Other (please specify)

11. Have you ever received an SBIR grant?

- ○ Yes
- ○ No

If so, what phase(s) and what is the title? What is the status?

12. Are you aware that Montana has a matching program for SBIR?

- ○ Yes
- ○ No

13. Would you be interested in learning more about the benefits of being a member of the Montana BioScience Alliance?

- ○ Yes
- ○ No

Thank you for participating in this survey! We truly hope this project benefits companies like yours.