

Washington State Workforce Training Report



APRIL 2006

I N F O . R E S O U R C E , I N C .



INTRODUCTION



The biotechnology and medical device industry in the state of Washington is comprised of more than 220 private companies, and twenty-two non-profit research organizations. The majority of the state's biotechnology companies are at the research and development (R&D) stage with a heavy reliance upon individuals with advanced degrees and specialized scientific skills. The majority of the state's medical device companies, by contrast, are largely in the manufacturing and production stage with a greater reliance upon production and technician level workers.

As biotechnology companies mature and move from the R&D stage into the manufacturing stage, their employment needs shift from advanced degrees and specialized scientific skills to clinical and production skills. However, the demand for these occupations is not well defined and little data is available to support workforce development efforts.

To address this lack of data, the Washington Biotechnology & Biomedical Association (WBBA) and the Workforce Development Council of Seattle-King County contracted with Info.Resource to conduct an employment survey of the state's biotechnology and medical device industry.

This Report is based on two surveys – a comprehensive Internet survey and a phone follow-up survey with companies that did not respond to the Internet survey. The Internet survey was sent by the WBBA to 206 designated company human resource or other company contacts. Twenty-five or 12 percent responded to the Internet survey. Follow-up phone calls by Info.Resource staff were made to 194* companies requesting end of the year employment data (Dec. 31, 2004 and projected Dec. 31, 2005 and 2006). 118 companies or sixty-one percent responded to the follow-up phone survey.

Excluded from the survey: *Note that universities, including the University of Washington, Washington State University, Eastern Washington University, and other colleges, along with organization such as Children's Hospital and Regional Medical Center, Pacific Northwest National Laboratory, Swedish Medical Center and Veterans Administration Hospital are excluded from the following given the difficulty in separating biotechnology and device specific employment from organization/institution total employment.*

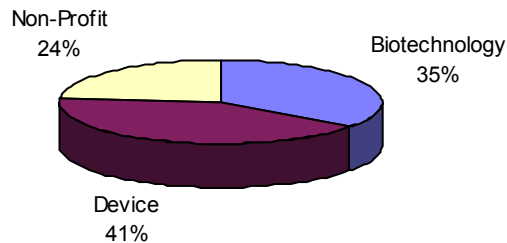
* The difference between the number of WBBA human resource/company contacts and the Info.Resource follow-up call to 194 companies is due to newly formed companies not included in the WBBA database.

SUMMARY OF RESULTS

EMPLOYMENT

The employment data includes information from the Internet survey and the phone survey. At the close of 2005, total aggregated biotechnology and medical device industry employment in Washington exceeded 18,500 people, an increase of 5.5 percent from 2004. In 2005, the biotechnology sector had more than 10,800 employees -- a 5.7 percent increase from the prior year. And the state's medical device employment exceeded 7,600 -- a 5.0 percent increase from a year earlier. Using the common advanced technology multiplier (3:1) it is estimated that these sectors combined indirectly to employ more than 55,500 people in the state of Washington.

Sector employment by percentage



ENTRY LEVEL SALARY AND EDUCATION LEVEL

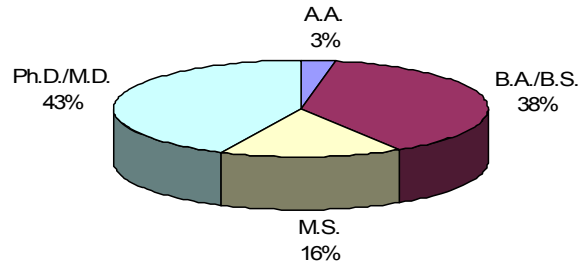
The following is average entry level salary data and percentage of science related hiring by degree level.

Average Entry Level Salary

- Salary AA Degree: \$29,380
- Salary BS Degree: \$43,200

Additional information regarding salaries was provided by Applied HR Strategies. A research associate with a BS degree and eight years of experience annual salary is \$65,000. A quality control specialist with an AA degree makes an average salary of \$36,000 and with five years experience makes close to \$60,000. An entry level manufacturing associate with an AA degree is paid an average \$35,000. A manufacturing manager with a BS degree has an annual salary of nearly \$59,000.

SCIENCE RELATED HIRING BY DEGREE



FUTURE HIRES

Notably, the occupational categories with the highest projected employment demand from 2005-2008 are for Bachelor and Associate degrees, including Laboratory Research, Clinical, Administration and Information Technology Systems. Other categories with high Bachelor degree demand include Marketing/Sales, Project Management, and Bioinformatics. (*see Appendix A, page 8*)

It should also be noted that the projected demand for Bachelor and Associate degree levels is significantly higher than projections (1996-1999) from a similar workforce training survey conducted in 1996 (*see Appendix B*).

PROFESSIONAL DEVELOPMENT

Fifty-eight percent of respondents provide employees with professional development training. The majority of the companies reimburse for professional development courses, and that training must relate to the employee's current job description, new equipment or software that has been or will be purchased, and the individual's future professional development goals.

TRAINING DESIRED BY EMPLOYEES

When asked what type of professional training employees desired, the responses varied depending on the type of job. Survey respondents reported that

- Hourly, administrative support and operations position employees desire a range of training with computer, communications and project management ranking the highest.
- Managers and executive staff desire training emphasizing management and leadership. It should be noted that the WBBA offers its members "From the Laboratory to Leadership, Developing Scientific Managers" and "Leveraging Your Leadership, Advanced Course for Experienced Scientific Leaders" in collaboration with The Leadership Edge, a San Diego based training company.

- Science-related technicians and researchers (up to Master's level degrees) desire training ranging from communications and project management to training specific to their area of scientific focus, such as biochemistry, clinical, materials, etc.
- Scientists (Ph.D.'s to M.D.s) also desire management and leadership training, along with more specific technical training ranging from clinical and regulatory to nanotechnology and health & safety.

COMPANY ANTICIPATED KNOWLEDGE AND SKILL DEVELOPMENT PRIORITIES OVER THE NEXT THREE YEARS.

Survey respondents reported that the highest priority subject areas (skills and knowledge) that staff will need to develop over the next 3 years include leadership training, project management, quality assurance/quality control, bioinformatics, and regulatory affairs, all of which reflect the maturing of the local industry as it moves from the R&D stage into the production stage, and uses newly available bioinformatics tools.

Companies anticipate a lack of training opportunities for current and future workers hired in the next three years in the management (personnel and project) and clinical areas.

SELECTING A TRAINING PROGRAM

Survey respondents reported that the highest priority in selecting a professional development training and education provider are the relevance of instructional content to company and/or individual training needs, followed by training that counts toward an academic degree or certification, the cost of the training and high quality instructors from industry.

YOUTH AND STUDENT OPPORTUNITIES

MENTORSHIPS/INTERNSHIPS



The survey results indicate that seven of the twenty-one respondents offer internships; four offered mentorships; and two offered job shadowing.

This data is consistent with previous education related surveys where companies express a high interest in supporting educational programs, but lack the expertise and the staffing required to implement such programs. It should also be note that all companies currently offering or that are interested in offering educational programs must resolve legal liability issues that involve students under the age of eighteen working in or near laboratories and/or near hazardous chemicals and biologics.

SURPLUS EQUIPMENT DONATIONS TO K-12 OR HIGHER EDUCATION TRAINING

Companies with surplus equipment will typically sell their items either directly to other local area firms, through advertising surplus equipment with WaBio.com or through a growing number of specialized third parties providing traditional or Internet based auction services. Specialized equipment, such as DNA sequencers, is usually acquired by local start-up companies.

Assisting companies dispose of surplus equipment through direct sale or educational donation is a service offered by Info.Resource in collaboration with the Washington Biotechnology Foundation.

CONCLUSION

Though the response rate was 12 percent, the data indicates consistency in the kinds of professional development needed as well as in the knowledge and skill development priorities in the life science industry over the next three years. Additionally, the data paints a solid picture of the training desired by employees as well as the anticipated lack of training opportunities for jobs in the human resources, project management and clinical areas. This knowledge helps provide direction for development of education and work force training programs.

APPENDIX A

Industry Definitions

Biotechnology: Biotechnology is a set of powerful tools that employ living organisms (or part of organisms) to make or modify products, improve plants or animals, or develop microorganisms for specific uses. Early biotechnology includes traditional animal and plant breeding techniques, and the use of yeast in making bread, beer, wine and cheese. 3. Modern biotechnology includes the industrial use of recombinant DNA, cell fusion, novel bioprocessing techniques, and bioremediation.

Medical Device: Medical device refers to the use of novel technology to develop highly sophisticated electronic products or medical devices for application in healthcare markets, such as ultrasound, defibrillators, and heart monitors.

Survey Respondents (n=25)

| Company | Biotechnology (72%) | Medical Device (28%) |
|---|------------------------|-------------------------|
| Astarte Biologics, LLC | X | |
| Axio Research Co. | X | |
| BioNeuronics.com | | X |
| Boston Scientific | | X |
| Cardiac Dimensions Inc | | X |
| Catch Incorporated | X | |
| CellCyte Genetics, Inc. | X | |
| Cerep | X | |
| Chondrex, Inc. | X | |
| EKOS Corporation | | X |
| Fred Hutchinson Cancer Research Center | X | |
| ICOS Corporation | X | |
| Institute of Neurotoxicology & Neurological Disorders | X | |
| Koronis Pharmaceuticals | X | |
| Light Sciences Corp | | X |
| LipoSonix, Inc. | | X |
| NanoString Technologies | X | |
| Northstar Neuroscience, Inc. | | X |
| Nura Inc. | X | |
| Pacific Biometrics Inc | X | |
| PATH | X | |
| Seattle Genetics, Inc. | X | |
| Swedish Health Services/Swedish Research Center | X | |
| Syntrix Biosystems | X | |
| VizX Labs LLC | X | |

SURVEY DATA FROM THE 25 INTERNET RESPONDERS:

1) Number of Employees: (n=24)

Total no. of employees: (as of Dec. 31, 2004)

In-state (WA): 3,749

Out-of-State: 17,420

Projected total employees: in WA? (as of Dec. 31, 2005)

In-state (WA): 3,992 (+243 or 6.5% increase from 2004)

Out-of-State: 17,460 (+40 or 0.2% increase from 2004)

2) Payroll and Salary? (as of Dec. 31, 2004)

a) Avg. Entry Level Annual Salary (AA Degree): \$34,311 (n=11)

b) Avg. Entry Level Annual Salary (BS Degree): \$44,444 (n=18)

(Note: Respondents represent 20% of the state's total biotechnology and medical device industry employment).

Education Levels of Current Employees

a) What percentage of your science-related departments only (i.e. data support, lab technicians, and researchers, but excluding clerical, administration, accounting, or plant operations) currently have an AA, BA/BS, or Ph.D. or MD degree?

Science Related Hiring by Degree (n=29)

- AA Degree: 3%
- BA/BS Degree: 41%
- MS Degree: 14%
- PhD/MD Degree: 42%

Future Hires

3) Please estimate the number and type of new employees you expect to hire in each of these areas.

| Category | Ph. D. | M.S. | B.S. | A.A. | Total | Percent |
|--------------------------|------------|------------|------------|------------|-------------|---------------|
| Administration (n=10) | 9 | 7 | 55 | 16 | 87 | 5.9% |
| Bioinformatics (n=7) | 28 | 12 | 18 | 0 | 58 | 4.0% |
| Clinical (n=9) | 28 | 24 | 70 | 6 | 128 | 8.7% |
| Facilities (n=5) | 0 | 3 | 16 | 3 | 22 | 1.5% |
| Human Resources (n=8) | 0 | 2 | 17 | 3 | 22 | 1.5% |
| IT Systems (n=10) | 5 | 6 | 47 | 13 | 71 | 4.8% |
| Lab Research (n=10) | 37 | 52 | 267 | 57 | 413 | 28.2% |
| Legal (n=4) | 2 | 1 | 1 | 0 | 4 | 0.3% |
| Manufacturing (n=6) | 1 | 0 | 8 | 4 | 13 | 0.9% |
| Marketing/Sales (n=11) | 0 | 9 | 50 | 9 | 68 | 4.6% |
| Project Management (n=7) | 0 | 9 | 23 | 0 | 32 | 2.2% |
| QA/QC/Validation (n=8) | 0 | 1 | 18 | 0 | 19 | 1.3% |
| Regulatory (n=7) | 0 | 6 | 5 | 1 | 12 | 0.8% |
| Other (n=5) | 208 | 135 | 151 | 22 | 516 | 35.2% |
| Totals | 318 | 267 | 746 | 134 | 1465 | 100.0% |
| Percent of Total | 22% | 18% | 51% | 9% | 100% | |

5) Training

Does your company provide employees with professional development training? (i.e. Planned investment in personal and/or professional development). (n=24)

Yes: 14 (58%) No: 10 (42%)

If yes, what is the type of training that your employees desire?

Hourly, administrative support, operations positions

- Business
- Communications/Interpersonal skills
- Computer
- Computer
- Computer and software skills
- Computer related
- Customer service
- Employee diversity
- Federal regulatory requirements
- In house training
- Job specific (off site)
- Management/Supervisory
- PC, management, etc. (on site)
- Project specific course/certificate
- Time management
- Writing skills

(Type of training desired continued)

Managers and executive staff

- Communications and presentation skills
- Computer
- Conferences
- Financial management
- Human Resources
- Human resources
- In house training
- Job-related conferences
- Leadership
- Leadership training
- Legal risks
- Legal updates
- License related education
- Local workshops
- Management and leadership
- Management development
- Management Skills
- Management training
- Management/Supervisory
- Master's programs
- Medical device specific
- Project management
- Regulatory updates
- Sales development
- Strategic leadership
- Whatever is needed to accomplish work

Science-related technicians and researchers (up to Master's level degrees)

- Materials
- Biochemistry
- Technical in area of expertise
- We have a graduate program
- Functional/Technical Expertise
- Writing/Presentation Skills
- Communications/Interpersonal Skills
- Project management/clinical training/certificate
- Software
- Technology
- Techniques
- Medical Device specific
- Medical associations/conferences
- Clinical Lab Procedures
- Job-related conferences
- GCP

Scientists (Ph.D.'s to M.D.s)

- Biochemistry
- Conferences
- Functional and technical expertise
- GCP
- Job related conferences
- Management and leadership
- Medical associations/conferences
- Nanotechnology
- Product-specific training (i.e. complex software apps)
- Programming
- Project management
- Regulatory info-clinical
- Safety certificates - radiation. materials., etc.
- Software
- Technical in area of expertise
- University
- Vendors
- Whatever is needed to accomplish work
- Writing and Presentations skills

Other types of training not listed above:

- Job specific skills
- License related education
- Meeting Management
- New systems training
- Project and time management
- Project Management
- Regulatory requirements
- Team Leadership

6) If your company reimburses for professional development, please include what is required for reimbursement of professional development: (n=16)

- Training must relate to current job description. (Yes = 16)
- Training relates to new equipment or software that has been or will soon be purchased. (Yes = 16)
- Training relates to future professional development goals of the individual employee. (Yes = 15)
- Training can not exceed a specific amount of money per year per employee. (Yes = 9)
- Outcome of training must result in a certification (Yes = 3)
- Outcome of training must result in a credential. (Yes = 3)

7) Please prioritize the following (1,2, 3,... with “1” being the highest priority) in selecting a professional development training and education provider:

Training and education factors for current employees by priority (n=18)

- 1) Relevance of instructional content to company and/or individual training needs (16)
 - 2) Training that counts toward an academic degree or certification (9)
 - 3) Cost of training (8)
 - 3) High quality instructors from industry (8)
 - 4) Convenient location of training for easy employee access (7)
 - 4) Convenient time (of day, of week) of training to minimize work loss (7)
 - 5) Training equipment that mirrors what is used at the company (6)
-

8) Please prioritize the following subject areas you anticipate staff needing to develop additional skills and knowledge in over the next 3 years. (1,2, 3,... with “1” being the highest priority) (n=16)

- 1) Leadership training (n=8 highest priority)
 - 2) Project management and/or communication training (n=7 highest priority)
 - 3) Quality Assurance/Quality Control (n=6 highest priority)
 - 4) Bioinformatics (n=4 highest priority)
 - 5) Regulatory Affairs (n=4 highest priority)
 - 6) Raising capital/funds (n=3 highest priority)
 - 7) Bioprocessing techniques (n=2 highest priority)
 - 8) GMP (n=2 highest priority)
 - 9) Technology Transfer (n=2 highest priority)
 - 10) Nanotechnology (n=0 highest priority)
-

9) Is there a lack of training opportunities for your current workers, as well as those you expect to hire in the next three years?

- Bioinformatics
 - Cultural diversity
 - Data management
 - GCP
 - Leadership Training
 - Management development
 - Project & time management
 - Project management
 - Clinical trial management certification
-

10) Youth and student opportunities

a) Does your company offer student internships, mentorships, job shadowing, and/or youth science programs?

- Internships offered by seven (7) companies.
- Mentorships offered by two (2) companies.
- Job Shadowing offered by four (4) companies.
- Other include:
 - Research assistants
 - Work study
 - Tours

b) If your company does offer any of the above, how many K- 12 and/or college students participated in the past year? (n=4)

- How many are high school students?
 - (None answered this question).
- How many college/university students?
 - (None answered this question).

- How many paid internship opportunities are provided at your company?
 - (None answered this question).
- Do you expect to increase the number of student internships (paid or not) next year?
 - Yes: 1
 - No: 3
- Do you offer opportunities for K-12 teachers to visit your facility? (e.g. facility/lab tours, job shadow or other Science Education Program involvement)
 - Yes: 3
 - No: 1
- We would be interested in doing so in the future.
 - Yes: 2
 - No: 2

c) If available, please provide contact information for the person in your company responsible for K- 12 outreach activities?

Boston Scientific
jonassor@bsci.com

ICOS Corporation
Diane Rosman (drosman@icos.com)

Nura Inc.
Marcia Strackhouse (mstrackhouse@nurainc.com)

11) If you plan to surplus equipment in the next 3 years, would you donate the equipment to support K-12 or higher education training programs?

- Potentially (ICOS)
- Used with Hutch education program (Fred Hutchinson Cancer Research Center)

Appendix B

1996-1999 Projected Hires by Discipline (n=15)

| | Ph.D. | M.S. | B.S. | A.A. | Total | Percent |
|-------------------------|------------|------------|------------|-----------|-------------|-------------|
| Analytical Chemistry | 9 | 5 | 9 | 4 | 27 | 3% |
| Biochemistry | 15 | 14 | 24 | 2 | 55 | 7% |
| Biomedical Engineer | 1 | 5 | 12 | 0 | 18 | 2% |
| Biophysics | 0 | 0 | 0 | 0 | 0 | 0% |
| Biostatistics | 6 | 24 | 3 | 0 | 33 | 4% |
| Biotechnician | 1 | 0 | 0 | 0 | 1 | 0% |
| Cell Biology | 12 | 7 | 22 | 2 | 43 | 5% |
| Chemical Engineer | 1 | 1 | 1 | 0 | 3 | 0% |
| Computer Science | 2 | 10 | 45 | 2 | 59 | 7% |
| Electrical Engineer | 1 | 5 | 14 | 0 | 20 | 2% |
| Genetics | 3 | 3 | 10 | 0 | 16 | 2% |
| Hematology | 0 | 2 | 8 | 0 | 10 | 1% |
| Immunology | 10 | 17 | 34 | 5 | 66 | 8% |
| Marine Biology | 0 | 0 | 0 | 0 | 0 | 0% |
| Mechanical Engineer | 1 | 8 | 31 | 2 | 42 | 5% |
| Medicine | 15 | 60 | 30 | 3 | 108 | 13% |
| Microbiology | 7 | 5 | 10 | 2 | 24 | 3% |
| Molecular Biology | 8 | 21 | 48 | 2 | 79 | 10% |
| Organic Chemistry | 16 | 2 | 55 | 0 | 7 | 9% |
| Pharmacology | 6 | 5 | 3 | 0 | 1 | 2% |
| Pharmacy | 0 | 1 | 0 | 0 | 1 | 0% |
| Physicist | 0 | 0 | 0 | 0 | 0 | 0% |
| Physiology | 1 | 0 | 2 | 0 | 3 | 0% |
| Plant Biology | 0 | 0 | 0 | 0 | 0 | 0% |
| Protein Chemistry | 15 | 13 | 24 | 2 | 54 | 7% |
| Software Engineer | 5 | 17 | 31 | 0 | 53 | 7% |
| Toxicology | 1 | 2 | 0 | 0 | 3 | 0% |
| Veterinary | 2 | 1 | 2 | 0 | 5 | 1% |
| Total | 138 | 228 | 418 | 26 | 810 | 100% |
| Percent of Total | 17% | 28% | 52% | 3% | 100% | |



The WDC is a 501(c)(3) nonprofit organization governed by a volunteer board appointed by the King County Executive and Seattle Mayor. The WDC works to provide a world class workforce training and development system for the residents and employers of King County.



The WBBA is a not-for-profit association of Washington state biotechnology and biomedical companies, research firms and related organizations.

I N F O . R E S O U R C E , I N C .

Info.Resource is a Seattle based company that owns and publishes a specialized national network of biotechnology, medical device, life science and pharmaceutical "trade association/state" based web sites.