

12345 El Monte Road

Los Altos Hills, California 94022

650.949.7777

**Nanoscience Program Report**

**For Greater South Bay and Peninsula Region**

**(Santa Clara and San Mateo Counties)**

**November 2014**

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| **Nanotechnology** |

CIP 2010: A program that prepares individuals to apply mathematical, scientific, and engineering principles and technical skills to manipulate matter at the atomic and molecular level (in the range of 1-100 nanometers) and to design, fabricate, and integrate nanoscale structures, devices, and systems. Includes instruction in materials science, thermodynamics, nanomaterials, nanoelectronics, and nano/micro device fabrication and testing.

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| **Target Occupations**‡ |
| Engineers, All Other (17-2199) |

‡Based on EMSI crosswalk of the Classification of Instructional Programs (CIP) codes with Standard Occupational Classification (SOC) codes as published by the U.S. Department of Education.

In 2014, the number of nanoscience (nanotechnology) jobs in the target occupations in Santa Clara and San Mateo Counties totaled 3,250. The Bureau of Labor Statistics (BLS) expects the total number of positions to decrease by 0.1% over the next three years. Regional openings in 2014, which included created jobs and turnover, totaled 70. There were no regional completions in nanoscience, but there were 206 completions from other related programs. These other programs are linked to multiple occupations and not all those who complete will enter the target occupations indicated in this report.

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| **Target Occupation Performance** |
| **3,250\*** | **-0.1%\*** | **$52.83/hr** |
| **Jobs (2014)** | **Growth (2014-2017)** | **Median Earnings** |
| National Location Quotient: 2.42† | National: 1.8% | National: $43.20/hr |

 \*Based on total number of jobs for target occupations Santa Clara and San Mateo Counties.

†Represents occupation density as compared to national average (national average=1).

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| Regional Openings (2014)\*\* | 70 |  |
| Regional Program Completions (2013) | 0 |  |
| All Regional Completions for Target Occupations†† (2013) | 206 |  |

 \*\*Openings include created jobs and turnover.

†† Includes all regional programs applicable to target occupations.

**Nanoscience Occupation Performance**

| **Target Occupations** | **Regional Openings (2014)** | **Median Hourly Earnings** | **Growth (2014-2017)** |
| --- | --- | --- | --- |
| Engineers, All Other (17-2199) | 70 | $52.83 | -0.1% |

**Regional Breakdown for Nanoscience**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **County Name** | **2014 Jobs** | **2017 Jobs** | **2014 Annual Openings** | **Median Hourly Earnings** | **2014 National Location Quotient** |
| Santa Clara | 2,552 | 2,526 | 47 | $52.64 | 2.62 |
| San Mateo | 698 | 720 | 23 | $53.53 | 1.90 |
| Total | 3,250 | 3,246 | 70 | $52.83 |  |

Other regional programs may train individuals eligible for the targeted nanoscience occupations, which are based on an occupation-program crosswalk developed by the Department of Education. These additional programs are offered at San Jose State University, Stanford University, Cogswell College and Santa Clara University. As noted earlier, many postsecondary programs are linked to multiple occupations and not all those who complete the program will enter the target occupation.

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| **Related Regional Programs Allowing Entry to Nanoscience** |
| **4** | **206** |
| **Programs (2013)** | **Completions (2013)** |

| **Program** | **2009** | **2010** | **2011** | **2012** | **2013** |
| --- | --- | --- | --- | --- | --- |
| Engineering, Other (14.9999) | 110 | 114 | 142 | 129 | 137 |
| Engineering, General (14.0101) | 135 | 152 | 111 | 90 | 65 |
| Engineering Physics/Applied Physics (14.1201) | 1 | 2 | 3 | 4 | 4 |
| Systems Engineering (14.2701) | 0 | 0 | 0 | 0 | 0 |

**Target Occupations Demographics**

The demographics among those employed in nanoscience occupations in Santa Clara and San Mateo Counties for 2013 show that most are men (85%) and almost half are between the ages of 25-44 (48%). The national breakdown of the education level among those employed in nanoscience occupations show that 82% have earned a Bachelor’s degree or above.

**Gender Demographics (Regional)**

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| --- | --- | --- |
| Gender |   |   |
| Male | 85% |  |
| Female | 15% |  |

 **Age Demographics (Regional)**

|  |  |  |
| --- | --- | --- |
| Age |   |   |
| 14-18 | 0% |  |
| 19-24 | 3% |  |
| 25-44 | 48% |  |
| 45-64 | 45% |  |
| 65+ | 4% |  |
| **Educational Attainment (National)** |
| Doctoral or professional degree | 7% |  |
| Master's degree | 26% |  |
| Bachelor's degree | 49% |  |
| Associate's degree | 7% |  |
| Some college, no degree | 8% |  |
| High school diploma or equivalent | 3% |  |
| Less than high school diploma | 0% |  |

**Industries Employing Nanoscience Occupations**

A number of industries in Santa Clara and San Mateo Counties employ those trained in nanoscience and its related occupations. The following table represents a regional industry breakdown of the number of nanoscience positions employed, the percentage of nanoscience jobs employed by industry and the percentage nanoscience jobs represent within all jobs by each industry. While research and development in the physical, engineering, and life sciences (except biotechnology) employed 14.8% of all regional nanoscience positions in 2014, nanoscience occupations represent only 1.6% of the total jobs in that industry.

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| **Inverse Staffing Patterns (Regional)** |
| **Industry** | **Occupation Jobs in Industry (2014)** | **% of Occupation in Industry (2014)** | **% of Total Jobs in Industry (2014)** |
| Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology) (541712) | 482 | 14.8% | 1.6% |
| Electronic Computer Manufacturing (334111) | 451 | 13.9% | 1.0% |
| Engineering Services (541330) | 259 | 8.0% | 2.3% |
| Semiconductor and Related Device Manufacturing (334413) | 254 | 7.8% | 0.8% |
| Federal Government, Civilian, Excluding Postal Service (901199) | 152 | 4.7% | 1.7% |

**Compatible Occupations for Nanoscience**

Individuals completing a Nanoscience program share many skills and abilities with other occupations. The Occupational Information Network (O\*Net) identifies compatible occupations based on an analysis of overlapping knowledge, skills and ability. Additional education required for transition can range from short on-site training to advanced postsecondary degrees. The following tables show how much education might be needed to be employed in these compatible occupations.

**Compatible Occupations\* for Nanoscience: Associate’s Degree or Less**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Rank | Occupation | Median Hourly Earnings | 2014 Jobs | 2014-2017 Change | 2014-2017 Estimated Annual Openings |
| 1 | Manufacturing Engineering Technologists | $28.71 | 994 | 3 | 19 |
| 2 | Industrial Engineering Technicians | $28.05 | 826 | 18 | 18 |
| 3 | Industrial Engineering Technologists | $28.71 | 994 | 3 | 19 |
| 4 | Mechanical Drafters | $30.36 | 632 | (24) | 7 |
| 5 | Nuclear Power Reactor Operators | $44.77 | 35 | 4 | 2 |
| 6 | Engineering Teachers, Postsecondary | $29.85 | 13,132 | 1,206 | 459 |
| 7 | Electrical Engineering Technologists | $28.71 | 994 | 3 | 19 |
| 8 | Quality Control Analysts | $23.73 | 710 | 43 | 34 |
| 9 | Chemical Technicians | $23.26 | 749 | 26 | 23 |
| 10 | Civil Drafters | $28.53 | 1,011 | 11 | 16 |

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| **Data Sources and Calculations** |

**State Data Sources**

This report uses state data from the following agencies: California Labor Market Information Department

**Institution Data**

The institution data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

**Completers Data**

The completers data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

**Occupation Data**

EMSI occupation employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry.

**Staffing Patterns Data**

The staffing pattern data in this report are compiled from several sources using a specialized process. For QCEW and Non-QCEW Employees classes of worker, sources include Occupational Employment Statistics, the National Industry-Occupation Employment Matrix, and the American Community Survey. For the Self-Employed and Extended Proprietors classes of worker, the primary source is the American Community Survey, with a small amount of information from Occupational Employment Statistics.

**Industry Data**

EMSI industry data have various sources depending on the class of worker. (1) For QCEW Employees, EMSI primarily uses the QCEW (Quarterly Census of Employment and Wages), with supplemental estimates from County Business Patterns and Current Employment Statistics. (2) Non-QCEW employees data are based on a number of sources including QCEW, Current Employment Statistics, County Business Patterns, BEA State and Local Personal Income reports, the National Industry-Occupation Employment Matrix (NIOEM), the American Community Survey, and Railroad Retirement Board statistics. (3) Self-Employed and Extended Proprietor classes of worker data are primarily based on the American Community Survey, Nonemployer Statistics, and BEA State and Local Personal Income Reports. Projections for QCEW and Non-QCEW Employees are informed by NIOEM and long-term industry projections published by individual states.