## TABLE OF CONTENTS

**Section 1: Introduction** ........................................................................................................................................... 3
  - Study Objective .................................................................................................................................................. 4
  - About Burtch Works ......................................................................................................................................... 5
  - Why the Burtch Works Study is Unprecedented ........................................................................................... 6

**Section 2: Study Design** ......................................................................................................................................... 7
  - The Sample ..................................................................................................................................................... 8
  - Identifying Data Scientists .............................................................................................................................. 8
  - Completeness and Age of Data ......................................................................................................................... 8
  - Segmentations of Data Scientists .................................................................................................................. 9

**Section 3: Data Scientists: Who They Are** ......................................................................................................... 12
  - Overview ....................................................................................................................................................... 13
  - Age of Data Scientists .................................................................................................................................... 14
  - Gender of Data Scientists ............................................................................................................................... 15
  - Education of Data Scientists ......................................................................................................................... 16
  - Location of Data Scientists .......................................................................................................................... 18
  - Residency Status of Data Scientists ............................................................................................................. 19
  - Industry of Data Scientists ........................................................................................................................... 20

**Section 4: Data Scientists: What They Earn** ......................................................................................................... 21
  - Overview ....................................................................................................................................................... 22
  - Compensation by Job Category ..................................................................................................................... 23
  - Compensation of Data Scientists vs. Other Big Data Professionals .............................................................. 25
  - Compensation by Region ................................................................................................................................ 26
  - Compensation by Industry ............................................................................................................................. 28

**Section 5: Advice from Burtch Works** ..................................................................................................................... 30
  - Demand for Data Scientists ............................................................................................................................ 31
  - Advice for Employers .................................................................................................................................... 31
  - Advice for Data Scientists ............................................................................................................................. 32

**Section 6: Appendix** .............................................................................................................................................. 33
  - Glossary of Terms .......................................................................................................................................... 34
Section 1

INTRODUCTION
Study Objective

The purpose of this report is to provide current information on the compensation of data scientists. In mid-2013, Burtch Works published the groundbreaking *Burtch Works Study: Salaries for Big Data Professionals*. Data scientists were intentionally excluded from the sample of Big Data professionals surveyed to produce that report. Although data scientists truly are Big Data professionals, their competencies and job responsibilities are sufficiently different to warrant a separate report.

Like other Big Data professionals, data scientists apply sophisticated quantitative skills to derive useful information from very large datasets. However, unlike other Big Data professionals, data scientists apply their skills to enormous sets of *unstructured* data, so they also have the skills necessary to efficiently store, retrieve, and exploit such data. Unstructured data are “messy” data. They are not data for which observations and fields are well-defined. Often they have not been collected for a specific purpose, and usually many of the data are useless.

An example of structured data are the data recorded by people deployed at an intersection of roads for a traffic engineering study. Using a data collection form on a mobile computing device, they record specific information about each vehicle passing through the intersection, such as the road on which it arrives, the one on which it departs, and whether it is a car or truck. These data are subsequently compiled in a database from which they are easily retrieved for analysis. An example of unstructured data are the data yielded by a camera installed at the intersection, continuously recording everything that occurs there. Vehicle arrivals, departures and sizes can be derived from the images yielded by the camera, but only with the development of an algorithm for reliably collecting this information from the images.

A frequently used example of big, unstructured data is the text posted on a social media web site. Such text might yield useful information about interests, preferences and attitudes of the web site’s users, but those users surely are not writing their posts in systematic ways to make these discoveries easy. Their posts have abbreviations, misspellings, and poor and inconsistent syntax. Moreover, a post might not have much relevance to the thread of a discussion, and even if it does, interpretation of the post might be difficult if an idiom, a metaphor or sarcasm has been used.

It is only in recent years that data storage has become sufficiently inexpensive that many firms have begun to save enormous sets of unstructured data, so it is only recently that many firms have begun to employ data scientists. Consequently, there is limited information available about who they are and how much they earn. Here, Burtch Works takes advantage of the data that it has for 171 data scientists in the U.S. to describe who they are, to report how much they earn, and to show how their pay varies.
About Burtch Works

Burtch Works Executive Recruiting is a team of 15 recruiters dedicated to placing the most capable analytics professionals in quantitative jobs nationwide. The Burtch Works team closely follows the careers of thousands of professionals and the job requirements of hundreds of firms, obtaining keen insight into the burgeoning profession of Big Data analytics and unmatched information about the compensation of Big Data professionals, including data scientists.

Burtch Works has strong relationships with more than 17,000 analytics professionals. Many of these relationships were established at the beginning of their careers, when a professional had just completed a Master’s or Ph.D. program, and have been maintained as the professional progressed through jobs of increasing responsibility. The Burtch Works recruiters are in regular contact with these professionals, by phone, e-mail, and attending professional conferences and trade shows. All along, the recruiters meticulously record information about the professionals, such as their education and skills, employers, job title and responsibilities, and, of course, their compensation.

Linda Burtch is the founder and Managing Director of Burtch Works, and has more than 30 years of experience placing analytics professionals. Her views on the profession are often sought by business media, and she has been interviewed by Fox News, CNBC, Forbes.com, the Chicago Tribune, and Columbus Business First. She is also a frequent speaker on Big Data career topics at luncheons, conferences, corporate meetings and webinars.

Linda has been a member of the Executive Board of the Chicago Chapter of the American Statistical Association for over ten years, and recently finished a term as the Board’s President. She is also an active member of INFORMS, and a Guest Faculty Member for the International Institute of Analytics. She has maintained a blog for many years, writing on topics of importance to analytics professionals and their employers, and her blog posts are frequently read and featured on many websites targeted to analytics professionals.
Why the Burtch Works Study is Unprecedented

The Burtch Works Study is different from any other compensation surveys because:

- **This study focuses solely on the compensation of data scientists.** Although Burtch Works has relationships with thousands of Big Data professionals*, this report provides information about 171 who are data scientists: those who have the computer science skills as well as analytic skills necessary to take advantage of enormous sets of unstructured data. Data scientists are a new and small subset of Big Data professionals. Burtch Works has more than 500 data scientists in its network; the 171 for whom Burtch Works has complete and current information comprise the sample for this study.

- **Burtch Works staff collected data by interviewing data scientists about their current jobs.** This method differs from the traditional one used for salary surveys, which is to obtain compensation data from human resources departments. Human resources managers generally have difficulty identifying employees who are data scientists, both because it is a new field and because a firm’s data scientists are almost never in a department named ‘data science.’ Moreover, perhaps because of a poor understanding of what data science is, or perhaps because data science has some cachet, it is often found in job descriptions or resumes of people who are not data scientists. Another important advantage of the interview process is that Burtch Works recruiters were able to obtain information about the professionals not often provided by human resources departments, such as education and residency status. Finally, because of their knowledge of the data science profession, when recruiters conducted interviews, they were able to obtain corrections or clarifications if information provided by the professionals did not seem credible.

- **Burtch Works reports job and demographic characteristics for data scientists, and it shows how compensation varies with some of these.** Burtch Works developed a categorization of jobs by management responsibility (whether the job includes a responsibility for managing other employees) and level (level of management responsibility or depth of expertise) and then assigned each data scientist to one of these categories (a typical feature of compensation studies). However, in addition to showing how data scientists are distributed across these job categories and how compensation varies by category, Burtch Works shows how data scientists vary in other ways, such as by residency status and industry, and shows how compensation varies with some of these other job and demographic characteristics.

- **Burtch Works compares the compensation of data scientists to that of other Big Data professionals.** Burtch Works uses data from its study of Big Data professionals, published in 2013, to compare the compensation of data scientists with that of other Big Data professionals with similar management responsibility and years of experience.

*For information on the compensation of other Big Data professionals, please consult the 2013 *Burtch Works Study: Salaries for Big Data Professionals.*
Section 2

STUDY DESIGN
The Sample

The sample consists of 171 of the more than 500 data scientists with whom Burtch Works has relationships. Each of these 171 professionals has the education, computer and analytic skills, and job responsibilities characteristic of data scientists. Additionally, for each one, Burtch Works has complete compensation and demographic data. Finally, for each professional in the sample, the data available were collected in an interview done no more than 30 months ago.

Identifying Data Scientists

Burtch Works used field of education, skills, and job responsibilities to identify those quantitative professionals who are data scientists.

Data scientists have an undergraduate major or a graduate degree in a quantitative field of study, often computer science or applied mathematics but also sometimes other quantitative disciplines such as physics and economics. More than 15 fields of study are represented by the 171 data scientists in the sample for this study.

Data scientists are usually proficient users of MapReduce tools like Hadoop to store data, and many can use tools such as Pig and Hive to retrieve and summarize them. Others use languages such as Python and Java to write programs to retrieve and summarize data from Hadoop clusters. Data scientists usually have a good knowledge of statistical methods and use tools such as R and SAS to derive insight from data. Many also use other methods to derive useful information from data, such as methods of pattern recognition, signal processing and visualization.

The job responsibilities of data scientists often require them to work with enormous, unstructured datasets. Some have a responsibility for “ETL”: extract data, often from multiple, disparate sources; transform it to meet operational requirements; and load it where it can be retrieved for analysis, such as in a Hadoop cluster or relational database. They generally all have a responsibility to retrieve data and derive useful information from them, often using sophisticated analytical methods.

Completeness and Age of Data

Burtch Works included a data scientist in the sample only if it has complete data for the professional. This includes compensation data—base salary, bonus eligibility and last bonus received—and also knowledge of whether the data scientist manages other people, the number managed, years of experience, region and industry of employment, education, residency status, and gender. Burtch Works required all of these data, so that it can describe data scientists and show how their compensation varies with job and demographic characteristics.

Additionally, Burtch Works included a data scientist in the sample only if the data was obtained in the last 30 months (a typical requirement of compensation surveys). Each of the 171 data scientists in the sample was interviewed by a Burtch Works recruiter at some point during the 30 months ending March 2014, most within the last year. Recruiters did these interviews during the course of executing searches for clients.
Segmentations of Data Scientists

Burtch Works assigned data scientists to groups based on their job and demographic characteristics. Firstly, Burtch Works divided data scientists into six job categories based on whether a data scientist manages employees and, if so, the level of management responsibility, and if not, years of experience and the depth of expertise:

**Figure 1. Definition of Individual Contributor Job Levels**

<table>
<thead>
<tr>
<th>Level</th>
<th>Responsibility</th>
<th>Typical Years of Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Learning the job, hands-on analytics and modeling</td>
<td>0-3 years</td>
</tr>
<tr>
<td>Level 2</td>
<td>Hands-on with data, working with more advanced problems and models, may help train Analysts</td>
<td>4-8 years</td>
</tr>
<tr>
<td>Level 3</td>
<td>Considered an analytics Subject Matter Expert, mentors and trains analysts</td>
<td>9+ years</td>
</tr>
</tbody>
</table>

**Figure 2. Definition of Manager Job Levels**

<table>
<thead>
<tr>
<th>Level</th>
<th>Responsibility</th>
<th>Typical Number of Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Tactical manager who leads a small group within a function, responsible for executing limited projects or tasks within a project</td>
<td>1-3 reports (direct or matrix)</td>
</tr>
<tr>
<td>Level 2</td>
<td>Manager who leads a function and manages a moderately sized team, responsible for executing strategy</td>
<td>4-9 reports (direct or matrix)</td>
</tr>
<tr>
<td>Level 3</td>
<td>Member of senior management who determines strategy and leads large teams, manages at the executive level</td>
<td>10+ reports (direct or matrix)</td>
</tr>
</tbody>
</table>
Burtch Works divided the U.S. into these five regions:

- Northeast
- Southeast
- Midwest
- Mountain
- West Coast

These regions are defined as shown in Figure 3 below:

*Figure 3. U.S. Geographic Regions*

Note: The Northeast included areas of Virginia within 50 miles of Washington, DC, and the Midwest included areas of Pennsylvania within 75 miles of Pittsburgh.
The firms for which data scientists work were divided into these nine industries:

- Consulting
- Corporate-Other
- Financial Services
- Gaming
- Government
- Healthcare/Pharmaceuticals
- Marketing Services
- Retail
- Technology

Each data scientist was assigned to one of these five residency status categories:

- U.S. Citizen
- F-1/OPT
- H-1B
- Permanent Resident
- Other

Finally, each data scientist was assigned to one of these four education categories:

- No college degree
- Bachelor’s degree
- Master’s degree
- PhD
Section 3

DATA SCIENTISTS: WHO THEY ARE
Overview

- Data scientists are young. They have a median of nine years of experience.
- Data scientists are overwhelmingly male: 88% are male, 12% are female.
- Data scientists are highly educated. 88% have at least a Master’s degree, and 46% have a Ph.D. While 86% of other Big Data professionals also have at least a Master’s degree, only 20% have a Ph.D.
- Not all data scientists were trained as mathematicians or computer scientists. Although the most common field of study for data scientists is mathematics, the number of data scientists with an engineering degree is almost as great as the number with a computer science degree. Also, significant numbers of data scientists have degrees in the natural sciences and economics.
- Data scientists are employed by firms nationwide, but a disproportionately large number, 43%, work on the West Coast (only about 15% of U.S. residents live in California, Oregon and Washington).
- At least 35% of data scientists are immigrants whose applications for visas and green cards were sponsored by their employers.
- By far, the Technology industry is the biggest employer of data scientists. Technology firms employ 40% of data scientists.
Age of Data Scientists

The recruiters at Burtch Works do not ask the age of the professionals with whom they work. However, they do ask them for their years of work experience, which is highly correlated with age.

Data scientists are typically young: the median years of experience is nine. Over one-third of data scientists are currently in the first five years of their careers. Among those with at least five years of experience (who have most likely transferred skills from another discipline to data science), few have more than 15 years of experience. Less than one-quarter of all data scientists have more than 15 years of experience.

Figure 4. Data Scientists by Years of Experience

Median: 9.0 years
Average: 10.1 years

<table>
<thead>
<tr>
<th>Years of Experience</th>
<th>Percentage of Data Scientists</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>40%</td>
</tr>
<tr>
<td>6-10</td>
<td>35%</td>
</tr>
<tr>
<td>11-15</td>
<td>30%</td>
</tr>
<tr>
<td>16-20</td>
<td>25%</td>
</tr>
<tr>
<td>21-25</td>
<td>20%</td>
</tr>
<tr>
<td>26-30</td>
<td>15%</td>
</tr>
<tr>
<td>30+</td>
<td>10%</td>
</tr>
</tbody>
</table>
Gender of Data Scientists

Disproportionately few STEM professionals are women:

- Math, Science, and Engineering: “3 men to every 1 woman” in the field\(^1\)
- Computer Science: “women comprise 27-29% of the computing workforce”\(^2\)
- Science, Technology, Engineering and Math: women occupy less than a quarter of the STEM positions\(^3\)

The 2013 Burtch Works Study showed that, similarly, 25% of other Big Data professionals are women. But data scientists are even less likely to be women. Currently, only 12% of data scientists are women:


Education of Data Scientists

Data scientists are highly educated: 88% have at least a Master’s degree, and more than half of those have a Ph.D. Nearly one-third of data scientists hold their most advanced degree in Mathematics or Statistics. Another one-third holds degrees in either Computer Science or Engineering.

Because MBA programs generally do not enable a student to develop the computer and quantitative analysis skills required of data scientists (there are a few notable exceptions), relatively few data scientists – only 10% – have an MBA. Most of those with an MBA have an undergraduate degree with a major such as mathematics or computer science.

Figure 7. Data Scientists by Education
**Figure 8. Data Scientists by Area of Study**

<table>
<thead>
<tr>
<th>Area of Study</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics/Statistics</td>
<td>32%</td>
</tr>
<tr>
<td>Computer Science</td>
<td>19%</td>
</tr>
<tr>
<td>Engineering</td>
<td>16%</td>
</tr>
<tr>
<td>Natural Science</td>
<td>9%</td>
</tr>
<tr>
<td>Economics</td>
<td>8%</td>
</tr>
<tr>
<td>Operations Research</td>
<td>5%</td>
</tr>
<tr>
<td>Social Science</td>
<td>4%</td>
</tr>
<tr>
<td>Business/Management</td>
<td>4%</td>
</tr>
<tr>
<td>Medical Science</td>
<td>3%</td>
</tr>
</tbody>
</table>

**Figure 9. Education of Data Scientists vs. Other Big Data Professionals**

- **Data Scientists**
  - No Degree: 0%
  - Bachelor's: 3%
  - Master's: 16%
  - Ph.D.: 32%

- **Big Data Professionals**
  - No Degree: 0%
  - Bachelor's: 32%
  - Master's: 66%
  - Ph.D.: 32%
Location of Data Scientists

43% of data scientists are employed on the West Coast, where only 15% of the U.S. population resides. One-quarter works in the Northeast, which has about 20% of the U.S. population. The remaining 32% of data scientists work for firms found throughout the Midwest, Mountain, and Southeast regions.

Figure 10. Data Scientists by Region
Residency Status of Data Scientists

A disproportionately large number of data scientists are from other countries. More than one-third have F-1/OPT or H-1B visas, or are permanent residents (and an unknown proportion of those who are U.S. citizens are also immigrants). Data scientists from other countries generally rely on their employers to sponsor their applications for visas and permanent residency.

Figure 11. Data Scientists by Residency Status

Figure 12. Residency Status of Data Scientists vs. Other Big Data Professionals
Industry of Data Scientists

The Technology industry, which includes manufacturers of IT equipment, software publishers, and telecommunications and Internet service providers, employs the largest proportion of data scientists, 40%. Other industries employing large numbers of data scientists include Marketing Services (advertising, media planning and buying, marketing analysis), Financial Services (brokerages, banks, insurance companies, credit card organizations), and Retail.

Figure 13. Data Scientists by Industry
Section 4

DATA SCIENTISTS: WHAT THEY EARN
Overview

• Data scientists who are managers earn substantially more than those who are individual contributors, and for both, compensation increases rapidly with scope of responsibility and years of experience.

• For all job categories, data scientists are paid more than other Big Data professionals.

• Generally, data scientists at job levels 1 and 2 are paid more by firms on the West Coast and in the Northeast than by those elsewhere in the U.S. (in “Middle U.S.”), but compensation of level 3 data scientists does not vary much across regions.

• For almost all job categories, Technology and Gaming firms pay the highest salaries to data scientists.
Compensation by Job Category

Data scientists who are managers make considerably more than those who are individual contributors, but for both, compensation increases significantly with scope of responsibility and years of experience. The median base salary increases from $80,000 for level 1 individual contributors to $150,000 for those at level 3, while it increases from $140,000 for a level 1 manager to $232,500 for a level 3 manager. While 63% of level 1 individual contributors are eligible for a bonus and earned a median bonus of $11,100, 69% of those at level 3 are eligible and earned a median bonus of $40,000. Among managers at level 1, 63% are eligible for a bonus and earned a median bonus of $23,600, while 100% of those at level 3 are eligible and earned a median bonus of $82,500.

The performance of many data scientists is acknowledged with equity awards. For example, while 69% of level 3 individual contributors are eligible for a bonus, 77% are eligible for a bonus, an award of equity, or both.

Figure 14. Distribution of Data Scientists by Management Responsibility

<table>
<thead>
<tr>
<th></th>
<th>Managers</th>
<th>Individual Contributors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Base Salary</td>
<td>$160,000</td>
<td>$120,000</td>
</tr>
<tr>
<td>Bonus Eligible</td>
<td>100%</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td>42%</td>
<td>58%</td>
</tr>
</tbody>
</table>
**Figure 15. Compensation of Individual Contributors by Job Level**

<table>
<thead>
<tr>
<th>Individual Contributor Job Level</th>
<th>Base Salary</th>
<th>Bonus Eligible</th>
<th>Actual Bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>25%</td>
<td>Median</td>
</tr>
<tr>
<td>Level 1</td>
<td>40</td>
<td>$75,000</td>
<td>$80,000</td>
</tr>
<tr>
<td>Level 2</td>
<td>24</td>
<td>$100,000</td>
<td>$120,000</td>
</tr>
<tr>
<td>Level 3</td>
<td>35</td>
<td>$136,250</td>
<td>$150,000</td>
</tr>
</tbody>
</table>

*77% of level 3 individual contributors are eligible for a bonus, equity award, or both, while only 75% of those at level 2 are eligible for a bonus, equity award, or both.

**Figure 16. Compensation of Managers by Job Level**

<table>
<thead>
<tr>
<th>Manager Job Level</th>
<th>Base Salary</th>
<th>Bonus Eligible</th>
<th>Actual Bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>25%</td>
<td>Median</td>
</tr>
<tr>
<td>Level 1</td>
<td>27</td>
<td>$128,000</td>
<td>$140,000</td>
</tr>
<tr>
<td>Level 2</td>
<td>33</td>
<td>$156,000</td>
<td>$183,000</td>
</tr>
<tr>
<td>Level 3</td>
<td>12</td>
<td>$197,500</td>
<td>$232,500</td>
</tr>
</tbody>
</table>

**Figure 17. Median and Mean Base Salaries of Individual Contributors by Job Level**

<table>
<thead>
<tr>
<th>Level</th>
<th>Median</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>$60,000</td>
<td>$75,000</td>
</tr>
<tr>
<td>Level 2</td>
<td>$120,000</td>
<td>$136,250</td>
</tr>
<tr>
<td>Level 3</td>
<td>$180,000</td>
<td>$232,500</td>
</tr>
</tbody>
</table>

**Figure 18. Median and Mean Base Salaries of Managers by Job Level**

<table>
<thead>
<tr>
<th>Level</th>
<th>Median</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>$60,000</td>
<td>$128,000</td>
</tr>
<tr>
<td>Level 2</td>
<td>$120,000</td>
<td>$183,000</td>
</tr>
<tr>
<td>Level 3</td>
<td>$180,000</td>
<td>$232,500</td>
</tr>
</tbody>
</table>
Compensation of Data Scientists vs. Other Big Data Professionals

In every job category, data scientists earn a higher median base salary than other Big Data professionals, as Figure 19 shows below. One reason is that a much larger proportion of data scientists have a Ph.D. Data scientists with Ph.D.’s earn higher salaries at more junior job levels, but the influence of a Ph.D. on compensation diminishes as a data scientist’s career progresses and experience, business knowledge and leadership skills become more influential.

Figure 19. Median Base Salary of Data Scientists vs. Other Big Data Professionals

Manager, Level 3
Data Scientists: +8%
Big Data Professionals
Manager, Level 2
+21%
Manager, Level 1
+17%
Individual Cont., Level 3
+30%
Individual Cont., Level 2
+41%
Individual Cont., Level 1
+23%

$0 $50,000 $100,000 $150,000 $200,000 $250,000
Compensation by Region

Firms on the West Coast and in the Northeast pay higher salaries to data scientists who are at job levels 1 and 2, but compensation for level 3 data scientists does not vary across the U.S.

Figure 20. Distribution of Base Salaries of Individual Contributors by Job Level and Region

<table>
<thead>
<tr>
<th>Job Level</th>
<th>Region</th>
<th>N</th>
<th>25%</th>
<th>Median</th>
<th>Mean</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Contributor,</td>
<td>Northeast</td>
<td>7</td>
<td>$72,500</td>
<td>$80,000</td>
<td>$82,143</td>
<td>$95,000</td>
</tr>
<tr>
<td>Level 1</td>
<td>Middle U.S.</td>
<td>19</td>
<td>$72,250</td>
<td>$75,000</td>
<td>$81,184</td>
<td>$95,500</td>
</tr>
<tr>
<td></td>
<td>West Coast</td>
<td>14</td>
<td>$80,000</td>
<td>$100,000</td>
<td>$99,750</td>
<td>$116,000</td>
</tr>
<tr>
<td>Individual Contributor,</td>
<td>Northeast</td>
<td>6</td>
<td>$111,250</td>
<td>$130,000</td>
<td>$125,333</td>
<td>$137,500</td>
</tr>
<tr>
<td>Level 2</td>
<td>Middle U.S.</td>
<td>7</td>
<td>$95,000</td>
<td>$100,000</td>
<td>$104,143</td>
<td>$113,000</td>
</tr>
<tr>
<td></td>
<td>West Coast</td>
<td>11</td>
<td>$107,500</td>
<td>$120,000</td>
<td>$125,091</td>
<td>$142,500</td>
</tr>
<tr>
<td>Individual Contributor,</td>
<td>Northeast</td>
<td>10</td>
<td>$131,875</td>
<td>$147,500</td>
<td>$160,250</td>
<td>$161,250</td>
</tr>
<tr>
<td>Level 3</td>
<td>Middle U.S.</td>
<td>9</td>
<td>$150,000</td>
<td>$157,000</td>
<td>$160,778</td>
<td>$165,000</td>
</tr>
<tr>
<td></td>
<td>West Coast</td>
<td>16</td>
<td>$138,750</td>
<td>$155,500</td>
<td>$165,563</td>
<td>$170,000</td>
</tr>
</tbody>
</table>

Figure 21. Distribution of Base Salaries of Managers by Job Level and Region

<table>
<thead>
<tr>
<th>Job Level</th>
<th>Region</th>
<th>N</th>
<th>25%</th>
<th>Median</th>
<th>Mean</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager, Level 1</td>
<td>Northeast</td>
<td>7</td>
<td>$140,000</td>
<td>$140,000</td>
<td>$138,714</td>
<td>$140,500</td>
</tr>
<tr>
<td></td>
<td>Middle U.S.</td>
<td>11</td>
<td>$127,500</td>
<td>$140,000</td>
<td>$142,273</td>
<td>$150,000</td>
</tr>
<tr>
<td></td>
<td>West Coast</td>
<td>9</td>
<td>$126,000</td>
<td>$135,000</td>
<td>$140,556</td>
<td>$141,000</td>
</tr>
<tr>
<td>Manager, Level 2</td>
<td>Northeast</td>
<td>10</td>
<td>$163,750</td>
<td>$182,500</td>
<td>$183,500</td>
<td>$200,000</td>
</tr>
<tr>
<td></td>
<td>Middle U.S.</td>
<td>6</td>
<td>$156,750</td>
<td>$174,000</td>
<td>$176,167</td>
<td>$184,500</td>
</tr>
<tr>
<td></td>
<td>West Coast</td>
<td>17</td>
<td>$155,000</td>
<td>$183,000</td>
<td>$182,559</td>
<td>$200,000</td>
</tr>
<tr>
<td>Manager, Level 3</td>
<td>Northeast</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Middle U.S.</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>West Coast</td>
<td>7</td>
<td>$232,500</td>
<td>$240,000</td>
<td>$248,571</td>
<td>$262,500</td>
</tr>
</tbody>
</table>
Figure 22. Median Base Salary by Region for Individual Contributors, Level 1

<table>
<thead>
<tr>
<th>Region</th>
<th>Data Scientists</th>
<th>Big Data Professionals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast</td>
<td>$80,000-100,000</td>
<td>$60,000-80,000</td>
</tr>
<tr>
<td>Middle U.S.</td>
<td>$80,000-100,000</td>
<td>$60,000-80,000</td>
</tr>
<tr>
<td>West Coast</td>
<td>$80,000-100,000</td>
<td>$60,000-80,000</td>
</tr>
</tbody>
</table>
Compensation by Industry

For almost all job categories, Technology and Gaming companies pay the highest salaries to data scientists. These firms also have the greatest demand for data scientists, employing almost half of them, and many are located near each other on the West Coast and in the Northeast, so higher compensation might be the result of competition for data scientists among these firms.

Figure 23. Distribution of Base Salaries of Individual Contributors by Job Level and Industry

<table>
<thead>
<tr>
<th>Job Level</th>
<th>Industry</th>
<th>N</th>
<th>25%</th>
<th>Median</th>
<th>Mean</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Contributor, Level 1</td>
<td>Technology &amp; Gaming</td>
<td>16</td>
<td>$74,375</td>
<td>$97,500</td>
<td>$92,250</td>
<td>$104,000</td>
</tr>
<tr>
<td></td>
<td>All Others</td>
<td>24</td>
<td>$75,000</td>
<td>$80,000</td>
<td>$84,917</td>
<td>$95,250</td>
</tr>
<tr>
<td>Individual Contributor, Level 2</td>
<td>Technology &amp; Gaming</td>
<td>9</td>
<td>$105,000</td>
<td>$120,000</td>
<td>$121,444</td>
<td>$135,000</td>
</tr>
<tr>
<td></td>
<td>All Others</td>
<td>14</td>
<td>$101,250</td>
<td>$125,000</td>
<td>$120,143</td>
<td>$137,750</td>
</tr>
<tr>
<td>Individual Contributor, Level 3</td>
<td>Technology &amp; Gaming</td>
<td>19</td>
<td>$135,000</td>
<td>$150,000</td>
<td>$165,526</td>
<td>$170,000</td>
</tr>
<tr>
<td></td>
<td>All Others</td>
<td>16</td>
<td>$139,375</td>
<td>$152,000</td>
<td>$159,594</td>
<td>$165,000</td>
</tr>
</tbody>
</table>

Figure 24. Distribution of Base Salaries of Managers by Job Level and Industry

<table>
<thead>
<tr>
<th>Job Level</th>
<th>Region</th>
<th>N</th>
<th>25%</th>
<th>Median</th>
<th>Mean</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager, Level 1</td>
<td>Technology &amp; Gaming</td>
<td>11</td>
<td>$134,000</td>
<td>$148,000</td>
<td>$150,273</td>
<td>$157,500</td>
</tr>
<tr>
<td></td>
<td>All Others</td>
<td>16</td>
<td>$125,000</td>
<td>$137,500</td>
<td>$134,250</td>
<td>$140,000</td>
</tr>
<tr>
<td>Manager, Level 2</td>
<td>Technology &amp; Gaming</td>
<td>16</td>
<td>$155,500</td>
<td>$184,000</td>
<td>$178,906</td>
<td>$200,000</td>
</tr>
<tr>
<td></td>
<td>All Others</td>
<td>17</td>
<td>$160,000</td>
<td>$180,000</td>
<td>$184,294</td>
<td>$200,000</td>
</tr>
<tr>
<td>Manager, Level 3</td>
<td>Technology &amp; Gaming</td>
<td>6</td>
<td>$223,750</td>
<td>$237,500</td>
<td>$235,000</td>
<td>$247,500</td>
</tr>
<tr>
<td></td>
<td>All Others</td>
<td>6</td>
<td>$170,000</td>
<td>$215,000</td>
<td>$223,333</td>
<td>$267,500</td>
</tr>
</tbody>
</table>
Figure 25. Median Base Salary by Industry for Individual Contributors, Level 1

- Technology & Gaming
  - Data Scientists
  - Big Data Professionals
- All Others

Salary range: $0 to $100,000
Section 5

ADVICE FROM BURTCH WORKS
Demand for Data Scientists

In recent years, the cost to store data has continued to decline, becoming sufficiently inexpensive that organizations can afford to save terabytes of data, often unstructured, from their manufacturing, marketing, sales and customer support processes, often with nothing more than a suspicion that they might yield advantages. Moreover, we continue to see the emergence of new, innovative tools for managing and deriving insight from this data. Hence there is a rapidly increasing demand for data scientists, who know how to apply the new tools of data science to big, unstructured data to solve business problems.

Burtch Works expects this trend to accelerate. Wireless technology, nano-electromechanical systems and the Internet are converging to yield The Internet of Things: “things” – people, animals, everyday physical objects – that are equipped with devices, enabling them to connect to the Internet, to identify themselves to other devices, and to transmit data automatically without any human-to-human or human-to-machine interaction. Sensors on shopping carts track shoppers’ paths through stores. Wearable fitness devices count steps, track heart rate, and make other measurements of fitness. GPS-enabled devices track the locations of vehicles, people and pets. Biochips uniquely identify farm animals and monitor their physiological state. The resulting accumulation of data will require more and more Big Data professionals, and the most acute need will be for data scientists. For capable data scientists, the future is rosy indeed!

Advice for Employers

What’s required of a firm to successfully recruit and retain data scientists? Here is the advice of Burtch Works:

- **Compensation.** In February, 2014, Burtch Works conducted a flash survey of analytics professionals, asking them to choose the two most compelling reasons for making or considering a job change. The most common motivator, chosen by 47% of respondents, is money (professional growth is second, selected by 38% of respondents). Clearly, compensation is important. Companies need to make sure their salary bands for data scientists are informed by current information, such as the data provided in this report. Use caution if relying on more generalized salary reports which will likely not be specific to this very young and emerging field. Firms might also distinguish themselves by offering sign-on bonuses, equity awards, flexible work schedules, or the opportunity to work from home.

- **Skills prioritization.** Organizations should not look for all of the skills they need in one person – for the “unicorn” with ETL and MapReduce skills, proficiency with statistical methods, experience doing text and image mining, a talent for data visualization, and a knowledge of the organization’s industry to boot! Instead, they should prioritize the skills required of a position and be ready to hire people who have only several of those that are most important. Focus on organizing a team whose skills complement each other and cover a wider range of your organization’s analytic needs.

- **Visa sponsorship.** Companies must be willing to sponsor applications for work visas and green cards. 59% of analytics professionals who have recently completed M.S. and Ph.D. programs are foreign nationals.
Training. Organizations should equip their current analytics professionals with the new tools of data science. Many companies have been reluctant to do this because of the cost of such training and because the workforce has become so itinerant. “Clawbacks” in agreements to pay for training might be used to address this.

As demand for data scientists increases, Burtch Works expects that an increasing proportion of data scientists in the U.S. will be foreign-born, but that nevertheless a shortage will develop. Consequently, Burtch Works encourages firms to lobby for and financially support (1) a stronger education in mathematics and computer science in America’s schools and (2) reforming the immigration laws that are constraining our technical workforce so that, eventually, there will be a sufficient number of capable data scientists available to U.S. firms.

Advice for Data Scientists

This report makes clear that a career in data science is a well-paid one. But has this report given the impression that if one is a proficient user of Hadoop, Pig and Python, then the only other requirement for this high paying and secure job is a heartbeat? That is certainly not the case. Employers are emphatic that a data scientist will not be effective if he or she cannot communicate effectively.

Data scientists must communicate with colleagues in other functions to frame the problems that they will attempt to solve with Big Data and, more often than not, Big Data is so big and complex that a problem will not be solved without the collaboration of a team of data scientists and other technical and non-technical professionals. Yes, technical skills are important, but the data scientist must also hone their communication skills to work productively with colleagues.

Finally, the data scientist must vigilantly distinguish what’s important from what’s interesting, in other words: always have business objectives top of mind. Happily, it is often the case that what’s important and what’s interesting are one and the same. However, when there is little likelihood that new and interesting technical knowledge is relevant to an important problem at hand, one must wait for another day to study that interesting technical topic.

Data scientists or employers looking for additional advice should not hesitate to reach out:

Burtch Works LLC
1560 Sherman Ave Suite 1005
Evanston, IL 60201
Call: 847-440-8555
Email: info@burtchworks.com
Glossary of Terms

This section provides definitions of terms used in this report.

**Base Salary.** An individual’s gross annual wages, excluding variable or one-time compensation such as relocation assistance, sign-on bonuses, bonuses, and long-term incentive plan compensation.

**Big Data Professionals.** Individuals who can apply sophisticated quantitative skills to data describing transactions, interactions, or other behaviors to derive insights and prescribe actions. They are distinguished from the “quants” of the past by the sheer quantity of data on which they operate, an abundance made possible by new opportunities for measuring behaviors and advances in technologies for the storage and retrieval of data.

**Bonus.** Short-term variable compensation usually awarded annually, such as individual or company performance-based bonuses. This does not include long-term incentive plan compensation or awards of stock or stock options.

**Data Scientist.** A Big Data professional who has both the proficiency for data management required to make Big Data accessible and also the analytical skills for deriving useful information from Big Data.

**F-1/OPT.** A residency status that allows a foreign undergraduate or graduate student who has a non-immigrant F-1 student visa to work in the U.S. without obtaining an H-1B visa. The student is required to have either completed his degree or pursued it for at least nine months.

**Geographic Region.** One of five groups of states that together comprise the entire United States. These five groups of states—Northeast, Southeast, Midwest, Mountain and West Coast—are shown in Figure 3 on page 10.

**H-1B.** A non-immigrant visa that allows a U.S. firm to temporarily employ a foreign worker in a specialty occupation for a period of three years, which is extendable to six and beyond. If a foreign worker with an H-1B visa quits or loses his job with the sponsoring firm, the worker must either find a new employer to sponsor an H-1B visa, be granted a new non-immigrant status, or leave the United States.

**Individual Contributor.** An employee who does not manage other employees. Individual contributors among the data scientists in the Burtch Works sample have all been assigned to one of three levels:

- **Level 1:** Responsible for learning the job; hands-on with analytics and modeling; 0-3 years’ experience
- **Level 2:** Hands-on with data, working with more advanced problems and models; may help train Analysts; 4-8 years of experience
- **Level 3:** Considered an analytics Subject Matter Expert; mentors and trains analysts; 9+ years’ experience

**Industry.** One of nine groups of firms employing the data scientists interviewed for this report. These nine industries are:

- **Consulting:** Industry that includes both large corporations and small “boutique” firms that provide professional advice to the managers of other firms. Category also includes outsourcing companies whose primary workforce is contracted by their clients, in order to move labor out of the internal business process to a third party organization.
- **Corporate-Other:** Companies whose industry falls outside of the categories delineated, such as airline companies, hospitality companies or distribution firms.
- **Financial Services:** Firms that provide services related to the finance industry, which encompasses a broad range of organizations that manage money including banks, insurance companies, and credit card organizations.
Gaming: Companies that develop and sell video, mobile, or other interactive games.

Government: Sector that includes groups within the federal government and organizations that contract with the government to provide consulting or other services.

Healthcare/Pharmaceuticals: Sector that includes companies that provide patients with healthcare services, and firms that manufacture medicinal drugs.

Marketing Services: Firms that provide advertising, media planning and buying, and marketing analysis services to other firms.

Retail: Organizations that purchase goods from a manufacturer to be sold for profit to the end-consumer.

Technology: Industry that includes companies that provide telecommunications services in addition to organizations that focus on creating or distributing technology products or services.

Manager. An employee who manages the work of other employees. Managers among the data scientists in the Burtch Works sample have all been assigned to one of three levels:

Level 1: Tactical manager who leads a small group within a function, responsible for executing limited-scale projects or tasks within a project; typically responsible for 1-3 direct reports or matrix individuals.

Level 2: Manager who leads a function and manages a moderately sized team; responsible for executing strategy; typically responsible for 4-9 direct reports or matrix individuals.

Level 3: Member of senior management who determines strategy and leads large teams; manages at the executive level; typically responsible for 10+ direct reports or matrix individuals.

Mean. Also known as the average, it is the sum of a set of values divided by the number of values. For example, the mean of N salaries is the sum of the salaries divided by N.

Median. The value obtained by ordering a set of numbers from smallest to largest and then taking the value in middle, or, if there are an even number of values, by taking the mean of the two values in the middle. For example, the median of N salaries is the salary for which there are as many salaries that are smaller as there are salaries that are larger.

N. The number of observations in a sample, sub-sample or table cell.

OPT. See F-1/OPT.

Permanent Resident. A residency status that allows a foreign national to permanently live and work in the United States. Those with this status have a United States Permanent Residence Card, which is known informally as a green card.

Salary Study. A study conducted to measure the distributions by salary of those in specific occupations. Traditionally, these studies have been executed by obtaining salary data from the human resources departments of firms employing professionals in those occupations rather than by interviewing those employees themselves.

STEM. Acronym for the fields of Science, Technology, Engineering and Mathematics.
ABOUT BURTCH WORKS

Burtch Works is a contingency executive recruiting firm dedicated to placing highly-qualified analytics and research professionals with a variety of specialties including data science, marketing science, marketing research, analytical database marketing, operations research and credit/risk analytics. Burtch Works’ collaborative team of recruiters has decades of experience placing candidates in the hottest jobs on the market, and has placed hundreds of job seekers with clients nationwide. Their client base includes a number of marquee clients from worldwide consulting firms and Fortune 100 companies to high growth startups and private equity groups.

Burtch Works tracks talent movement and trends in the field closely to follow the pulse of the industry and to observe the creation of new roles that support analytics functions throughout the enterprise. They develop lasting relationships with candidates that continue throughout their careers and encompass all job levels. Burtch Works also conducts original research including salary studies for analytics and marketing research professionals, which gives them a unique perspective into this growing industry. Whether you are looking to build a first class analytics staff for your organization or are interested in hearing about our opportunities in analytics we encourage you to contact us.

CONTACT US

If your organization seeks to fill analytics positions, please email clients@burtchworks.com. If you are interested in quantitative opportunities, please email candidates@burtchworks.com. For general inquiries, call 847-440-8555, or email info@burtchworks.com.