



HLC Accreditation 2020-2021

Evidence Document

Education Advisory Board (EAB)

COE Forum

Market Demand for a Master's-Level Computing Program

Analysis of Regional Employer Demand, Program
Characteristics, and Student Trends

Additional information: Leadership at Wichita State University approached the Forum as they considered launching a Master of Science in Computing program. Through quantitative data analytics, interviews with directors of comparable programs, and secondary research, the Forum sought to assess the market viability of such a program.



MARKET RESEARCH BRIEF

Market Demand for a Master's-Level **Computing** Program

Analysis of Regional Employer Demand, Program
Characteristics, and Student Trends

Jill Rosenfeld

Market Research Associate

Kirsten Hinck

Market Research Manager

LEGAL CAVEAT

EAB Global, Inc. ("EAB") has made efforts to verify the accuracy of the information it provides to members. This report relies on data obtained from many sources, however, and EAB cannot guarantee the accuracy of the information provided or any analysis based thereon. In addition, neither EAB nor any of its affiliates (each, an "EAB Organization") is in the business of giving legal, accounting, or other professional advice, and its reports should not be construed as professional advice. In particular, members should not rely on any legal commentary in this report as a basis for action or assume that any tactics described herein would be permitted by applicable law or appropriate for a given member's situation. Members are advised to consult with appropriate professionals concerning legal, tax, or accounting issues, before implementing any of these tactics. No EAB Organization or any of its respective officers, directors, employees, or agents shall be liable for any claims, liabilities, or expenses relating to (a) any errors or omissions in this report, whether caused by any EAB organization, or any of their respective employees or agents, or sources or other third parties, (b) any recommendation by any EAB Organization, or (c) failure of member and its employees and agents to abide by the terms set forth herein.

EAB is a registered trademark of EAB Global, Inc. in the United States and other countries. Members are not permitted to use these trademarks, or any other trademark, product name, service name, trade name, and logo of any EAB Organization without prior written consent of EAB. Other trademarks, product names, service names, trade names, and logos used within these pages are the property of their respective holders. Use of other company trademarks, product names, service names, trade names, and logos or images of the same does not necessarily constitute (a) an endorsement by such company of an EAB Organization and its products and services, or (b) an endorsement of the company or its products or services by an EAB Organization. No EAB Organization is affiliated with any such company.

IMPORTANT: Please read the following.

EAB has prepared this report for the exclusive use of its members. Each member acknowledges and agrees that this report and the information contained herein (collectively, the "Report") are confidential and proprietary to EAB. By accepting delivery of this Report, each member agrees to abide by the terms as stated herein, including the following:

1. All right, title, and interest in and to this Report is owned by an EAB Organization. Except as stated herein, no right, license, permission, or interest of any kind in this Report is intended to be given, transferred to, or acquired by a member. Each member is authorized to use this Report only to the extent expressly authorized herein.
2. Each member shall not sell, license, republish, distribute, or post online or otherwise this Report, in part or in whole. Each member shall not disseminate or permit the use of, and shall take reasonable precautions to prevent such dissemination or use of, this Report by (a) any of its employees and agents (except as stated below), or (b) any third party.
3. Each member may make this Report available solely to those of its employees and agents who (a) are registered for the workshop or membership program of which this Report is a part, (b) require access to this Report in order to learn from the information described herein, and (c) agree not to disclose this Report to other employees or agents or any third party. Each member shall use, and shall ensure that its employees and agents use, this Report for its internal use only. Each member may make a limited number of copies, solely as adequate for use by its employees and agents in accordance with the terms herein.
4. Each member shall not remove from this Report any confidential markings, copyright notices, and/or other similar indicia herein.
5. Each member is responsible for any breach of its obligations as stated herein by any of its employees or agents.
6. If a member is unwilling to abide by any of the foregoing obligations, then such member shall promptly return this Report and all copies thereof to EAB.

Table of Contents

1) Research Methodology	4
Project Challenge	4
Methodology and Definitions	4
Emsi’s Analyst and Alumni Insight	4
Project Sources	5
Profiled Institutions.....	5
2) Executive Overview	6
3) Trends in Employer Demand	7
Historical Demand	7
Potential Job Outcomes for Graduates	8
Employers with the Most Job Openings.....	9
4) Program Design	10
Modality	10
Curriculum.....	11
Program Characteristics	12
Partnerships and Associations	13
5) Enrollment and Recruitment	14
Enrollment Trends	14
Student Demographics	15
Marketing Strategies.....	16
Appendix: Networking Contacts	17

1) Research Methodology

Project Challenge

Leadership at Wichita State University approached the Forum as they considered launching a Master of Science in Computing program. Through quantitative data analytics, interviews with directors of comparable programs, and secondary research, the Forum sought to assess the market viability of such a program.

EAB's market research function provides insights which guide strategic programmatic decisions at member institutions. The Forum combines qualitative and quantitative data to help administrators identify opportunities for new program development, assess job market trends, and align curriculum with employer and student demand.

EAB reports rely on labor market data from Emsi's proprietary Analyst™ and Alumni Insight™ tools (description below). Reports occasionally use data from the United States Census Bureau and United States Bureau of Labor Statistics data to explore occupation and job trends. Market research reports may also incorporate Integrated Postsecondary Education Data System (IPEDS) data to assess student enrollment, demographics, and completion rates across existing programs.

Methodology and Definitions

Methodology: Unless stated otherwise, this report includes data from online job postings from February 2018 to January 2019. To best estimate demand for master's-level computing professionals, the Forum analyzed job postings for master's-level professionals who possess related hard skills such as 'cyber security,' 'data analytics,' and 'software systems.' The Forum excluded job postings for master's-level professionals with skills such as 'algorithm design' that a computer science program would confer since the proposed computing program confers a distinct set of skills.

Definitions: "State" and "statewide data" refer to Kansas. "Region" and "regional data" refer to the following metropolitan statistical areas:

- Dallas-Fort Worth-Arlington, TX;
- Denver-Aurora-Lakewood, CO;
- Houston-The Woodlands-Sugar Land, TX;
- Kansas City, MO-KS;
- Oklahoma City, OK;
- St. Louis MO-IL; and
- Tulsa, OK

Emsi's Analyst and Alumni Insight

EAB's Partner for Comprehensive Labor Market Data

This report includes data made available through EAB's partnership with Emsi (Economic Modeling Specialists International), a labor market analytics firm serving higher education, economic development, and industry leaders in the U.S., Canada and the United Kingdom.

Emsi curates and maintains the most comprehensive labor market data sets available for academic program planning, providing real-time job posting data, workforce and alumni outcomes data, and traditional government sources of data. Under this partnership, EAB may use Emsi's proprietary Analyst™ and Alumni Insight™ tools to answer member questions about employer demand, the competitive landscape, in-demand skills, postings versus actual hires, and skills gaps between job postings and professionals in the workforce. The Emsi tools also provide EAB with in-depth access

to unsuppressed, zip-code-level government data for occupations, industries, programs, and demographics. For more complete descriptions of the Emsi tools, visit:

- <http://www.economicmodeling.com/analyst/>
- <https://www.economicmodeling.com/alumni-insight/>

To learn more about Emsi and its software and services, please contact Bob Hieronymus, Vice President of Business Development at bob.hieronymus@economicmodeling.com or (208) 883-3500.

Project Sources

The Forum consulted the following sources for this report:

- EAB’s internal and online research libraries (eab.com)
- National Center for Education Statistics (NCES) (<http://nces.ed.gov/>)
- Bureau of Labor Statistics (BLS) (<https://www.bls.gov/>)
- Profiled programs’ web pages:
 - Georgia Institute of Technology, “Online Master of Science in Cybersecurity,” accessed February 2019, <https://pe.gatech.edu/degrees/cybersecurity>.
 - Marquette University, “Master of Science in Computing,” accessed February 2019, <https://www.marquette.edu/mscs/grad-computing.shtml>.
 - University of Maryland University College, “Master of Science in Data Analytics,” accessed February 2019, <https://www.umuc.edu/academic-programs/masters-degrees/data-analytics.cfm>.
 - University of Utah, “Master of Science in Computing,” accessed February 2019, <http://www.cs.utah.edu/graduate/#>.
 - Valparaiso University, “Master of Science in Cyber Security,” accessed February 2019, <https://www.valpo.edu/onlinecybersecurity/>.

Profiled Institutions

The Forum prioritized outreach to institutions with Master of Science programs in data analytics, cybersecurity, or related applied computing disciplines, which offer these programs in an online or hybrid format. The Forum interviewed program directors or profiled programs via secondary research at the following institutions:

A Guide to Institutions Profiled in this Brief¹

Institution	Location	Approximate Institutional Enrollment (Undergraduate/Total)	Carnegie Classification
Eastern Kentucky University*	South	14,000 / 16,500	Master’s Colleges & Universities: Larger Programs
Georgia Institute of Technology	South	15,500 / 29,500	Doctoral Universities: Highest Research Activity
Marquette University	Midwest	8,500 / 11,500	Doctoral Universities: Higher Research Activity
University of Maryland University College	Mid-Atlantic	49,500 / 59,500	Master’s Colleges & Universities: Larger Programs
University of Utah*	Mountain West	24,500 / 33,000	Doctoral Universities: Very High Research Activity
Valparaiso University	Midwest	3,000 / 4,000	Master’s Colleges & Universities: Larger Programs

*Profiled via secondary research

1) [National Center for Education Statistics](http://nces.ed.gov/ipeds/data/ipedsdatatools/)

2) Executive Overview

Regional and state employer demand for master’s-level computing professionals increased between September 2016 and January 2019. During this time, regional job postings for master’s-level computing professionals increased 169 percent (i.e., from 2,454 postings to 6,599 postings). Comparatively, regional demand for all master’s-level professionals increased 89 percent in the same time. Kansas employer demand for master’s-level computing professionals increased 122 percent from September 2016 to January 2019. By comparison, Kansas employers demonstrate a 90 percent growth in demand for all master’s-level professionals from September 2016 to January 2019.

Employers from diverse fields such as telecommunications and defense seek to employ master’s-level computing professionals. State and regional employers frequently seek master’s-level computing professionals for positions in fields outside software and technology, including health care and the finance. All contacts at master’s-level computing programs where the Forum conducted interviews report program graduates find employment across industries as all industries now employ technology and data analytics to enhance function. As expected, state and regional employers in the technology and software development industry also seek to employ master’s-level computing professionals.

Offer students choices of specializations (e.g., cybersecurity, data analytics) to align with competitor programs and employer demand for master’s-level computing professionals with corresponding skills. Master of Science in Computing programs at the **University of Utah** and **Marquette University** and the Master of Science in Applied Computing at **Eastern Kentucky University** allow students to choose specializations. The number of available specializations ranges from two at Marquette University to eight at the University of Utah. Students at Marquette University choose between “Information Assurance and Cyber Defense” and “Big Data and Data Analytics” and may also choose to enroll without a specialization. At Eastern Kentucky University and the University of Utah, students must choose a specialization from four options.^{2, 3}

Use outcomes-based marketing messages and offer remedial coursework in basic computing skills to attract career changers to a program at *Wichita State University*. Previous EAB research indicates prospective students respond positively to marketing which features potential career outcomes for program graduates (e.g., job titles, salary potential).⁴ Contacts report career changers enroll in master’s-level computing programs due to high earnings potential and the opportunity to work in an exciting, evolving field. **Marquette University** offers a summer bootcamp experience to give career changers with no background in computing the skills necessary to complete the full master’s degree (e.g., programming, data analytics).

2) University of Utah, “[Graduate Handbook](#)”

3) Eastern Kentucky University, “[Master of Science in Applied Computing](#)”

4) EAB, “[Competing on Student Outcomes to Attract Today’s Career Changer](#),” 2017.

3) Trends in Employer Demand

Historical Demand

Regional and State Employers Demonstrate Increases in Demand for Master’s-Level Computing Professionals Between September 2016 and January 2019

Both regionally and in Kansas, employer demand for master’s-level computing professionals grew faster than employer demand for all master’s-level professionals from September 2016 to January 2019. Between September 2016 and January 2019, regional demand for master’s-level computing professionals increased 169 percent (i.e., from 2,454 to 6,599 monthly job postings). Comparatively, regional demand for all master’s-level professionals increased 89 percent during the same period (i.e., from 30,259 to 57,170 postings). In Kansas, employer demand for master’s-level computing professionals increased 122 percent between September 2016 and January 2019 (i.e., from 189 to 420 job postings). Demand for all master’s-level professionals in Kansas grew 90 percent in the same time.

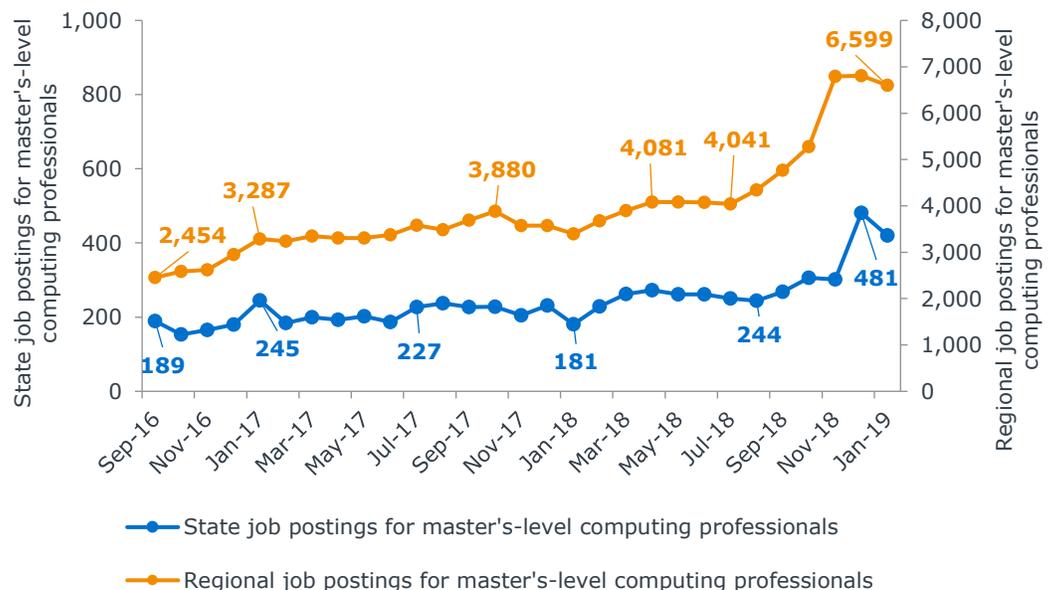
23,366

Regional employers posted 23,366 job openings for master’s-level computing professionals from February 2018 to January 2019.

Emsi Analyst predicts regional employment for ‘software developers, applications’ and ‘information security analysts,’ both common occupations in job postings for master’s-level computing professionals, will both grow 28 percent between 2018 and 2028. In comparison, Emsi projects regional employment for all occupations will grow an average of 13 percent during the same period. Emsi predicts state employment of ‘software developers, applications’ to grow 29 percent and ‘information security analysts’ to grow 26 percent between 2018 and 2028. Emsi predicts employment across all occupations in Kansas will grow four percent in this time.

Historical Employer Demand for Master’s-Level Computing Professionals

September 2016-January 2019, Regional and State Data⁵



5) Emsi Analyst™

Potential Job Outcomes for Graduates

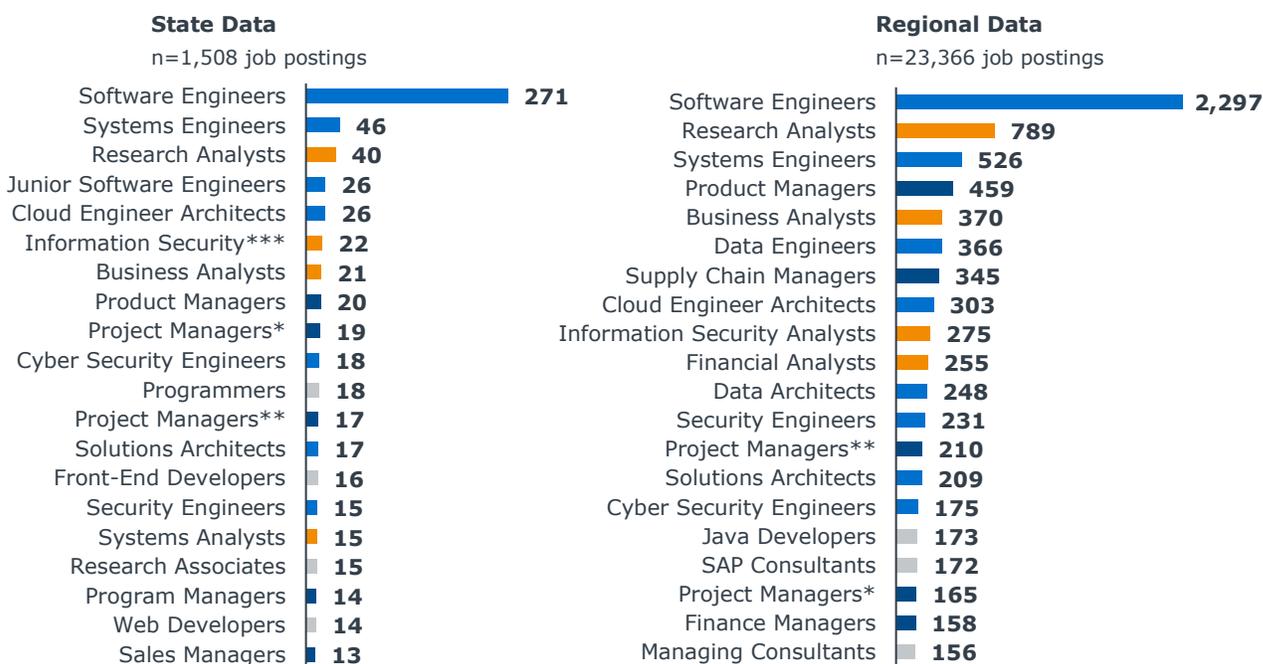
Advertise Potential for Master’s-Level Computing Professionals to Gain Employment in Engineer and Management Positions to Secure Enrollments

Administrators at **Wichita State University** should advertise potential for program graduates to move into management roles to attract students to the Master of Science in Computing program. Regional and state employers frequently post job openings that seek master’s-level computing professionals for a variety of management positions, including ‘product managers’ and ‘supply chain managers.’ ‘Product manager’ positions make up two percent of regional job postings and one percent of state job postings for master’s-level computing professionals between February 2019 and January 2018 (i.e., 459 of 23,366 regional job postings, 20 of 1,508 state job postings). ‘Product manager’ represents the most frequently posted management-related job title for master’s-level computing professionals in the state and region from February 2018 to January 2019. Administrators at the **University of Maryland University College** report graduates of the Master of Data Analytics program often gain employment in management positions.

Employers seek master’s-level computing professionals for ‘software engineer’ positions in 271 of 1,508 relevant statewide job postings and 2,297 of 23,366 relevant regional job postings between February 2018 and January 2019. ‘Software engineer’ represented the most frequently posted job title in relevant state and regional job postings during this period (i.e., 18 percent and 10 percent of relevant job postings, respectively). Employers seek master’s-level computing professionals for other programming job titles (e.g., ‘systems engineers,’ ‘cyber security engineers’). Profiled programs offer specializations, such as “Software Engineering and Computer Security” at the **University of Utah**, that align with regional and state employer demand for master’s-level computing professionals. For more information on specializations in profiled master’s-level computing programs, please see page 12.

Top Job Titles for Master’s-Level Computing Professionals

February 2018-January 2019, State and Regional Data⁶



■ Engineer and Architect Positions
 ■ Analyst Positions
 ■ Management Positions

*Project Managers (Management)
 **Project Managers (Computer and Mathematical)
 ***Information Security Analysts

6) Emsi Analyst™

Employers with the Most Job Openings

Companies in a Wide Variety of Fields Seek to Employ Master's-Level Computing Professionals

As expected, state and regional employers seek master's-level computing professionals for positions in the technology industry. Between February 2018 and January 2019, the software development company Oracle Corporation posts 149 of 1,508 relevant state job postings (i.e., ten percent) and 1,175 of 23,366 relevant regional job postings (i.e., five percent). Oracle Corporation seeks master's-level computing professionals for positions such as 'security engineers,' 'software engineers,' and 'business analytics managers.'

Master's-level computing professionals may also gain employment in a variety of fields beyond the technology industry, including defense, financial services, and professional services. Financial employers JPMorgan Chase & Co. and Capital One Financial Corporation seek master's-level computing professionals for positions such as 'data engineers,' 'data architects,' and 'business analysts,' between February 2018 and January 2019. Other fields with demand for master's-level computing professionals include health care and insurance, and telecommunications.

Administrators at **Marquette University** note all industries now rely on data and technology services, and therefore master's-level computing professionals may find employment in any industry. For example, contacts at Marquette University report recent graduates of the Master of Science in Computing secured employment in the health care, technology, insurance, and manufacturing industries.

Employers with the Most Job Postings for Master's-Level Computing Professionals

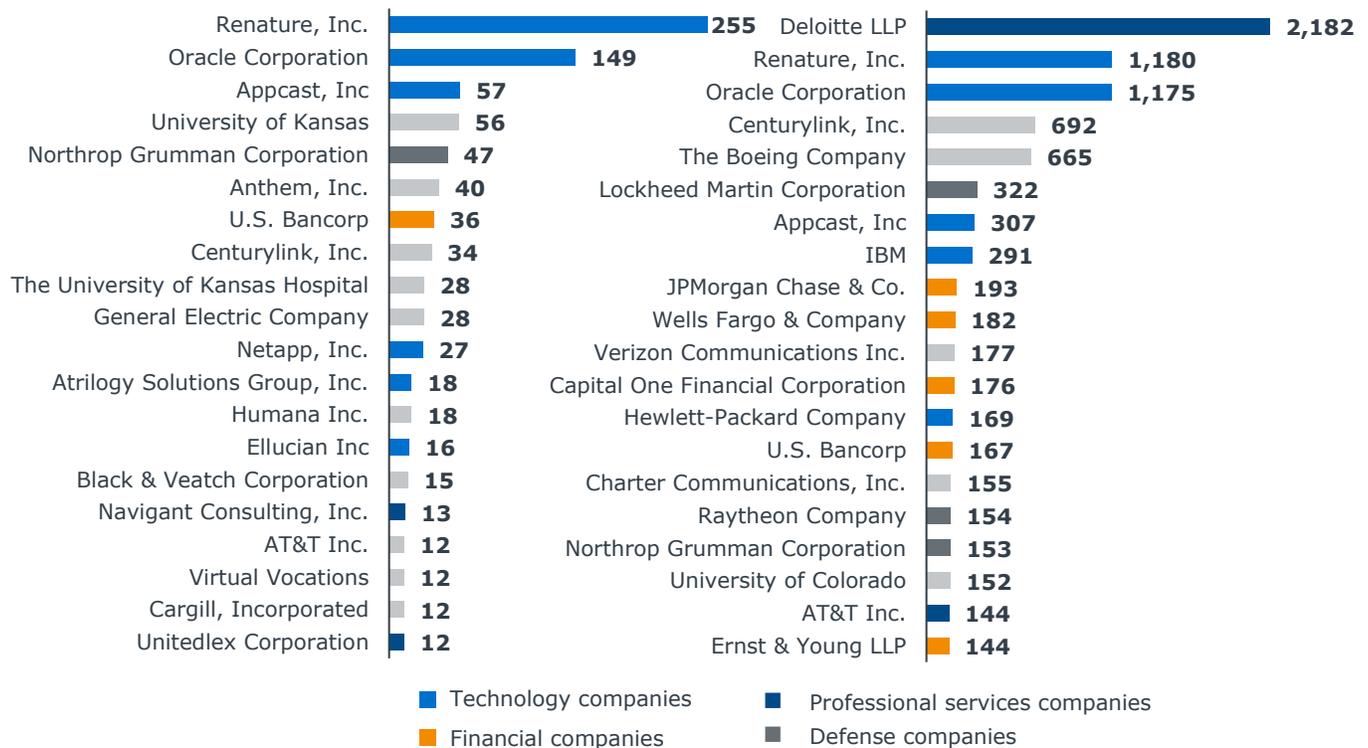
February 2018-January 2019, State and Regional Data⁷

State Data

n=1,508 job postings

Regional Data

n=23,366 job postings



7) Emsi Analyst™

4) Program Design

Modality

Most Profiled Institutions Offer Online Delivery Options for Master’s-Level Computing Programs to Increase Program Accessibility for Working Professionals

All profiled institutions except **Eastern Kentucky University** and the **University of Utah** offer master’s-level computing programs online. At the **Georgia Institute of Technology**, students can complete the Master of Science in Cybersecurity and Master of Science in Analytics either online or on-campus. Contacts at the Georgia Institute of Technology note most students enroll online and continue to work full time while studying. The **University of Maryland University College** delivers the Master of Science in Data Analytics program exclusively online.

At **Marquette University**, which offers the program both face-to-face and online, contacts report most students enroll on campus and administrators note the development of an online delivery model did not significantly impact enrollments or completions. In contrast, contacts at **Valparaiso University** note the online format of the Master of Science in Cyber Security accounts for all but one to three of the approximately ten students enrolled in the program at any given time.

Administrators at Marquette University note the master’s-level computing program’s position within the arts & sciences department allows students to complete coursework across disciplines. For example, students interested in human-computer interaction may complete psychology courses. However, no contacts consider the school or department where a program is housed provides a significant impact on student outcomes.

Characteristics of Profiled Master’s-Level Computing Programs

Institution and Program Title	School or Department Which Houses the Program	Modality	Number of Required Credits	Estimated Total Cost
Georgia Institute of Technology Master of Science in Cybersecurity	School of Professional Education	<ul style="list-style-type: none"> • Online • Face-to-face 	30	\$9,300
Master of Science in Analytics			36	\$9,900
University of Utah Master of Science in Computing	School of Computing	Face-to-face	30	<ul style="list-style-type: none"> • \$10,852 (in-state) • \$35,184 (out-of-state)
Eastern Kentucky University Master of Science in Applied Computing	Department of Computer Science	Face-to-face	30	<ul style="list-style-type: none"> • \$11,250 (in-state) • \$23,461 (out-of-state)
Valparaiso University Master of Science in Cyber Security	The Graduate School	<ul style="list-style-type: none"> • Online • Face-to-face 	36	\$22,680
University of Maryland University College Master of Science in Data Analytics	Not Applicable	Online	36	\$24,984
Marquette University Master of Science in Computing	Arts & Sciences	<ul style="list-style-type: none"> • Online • Face-to-face 	36	\$42,120

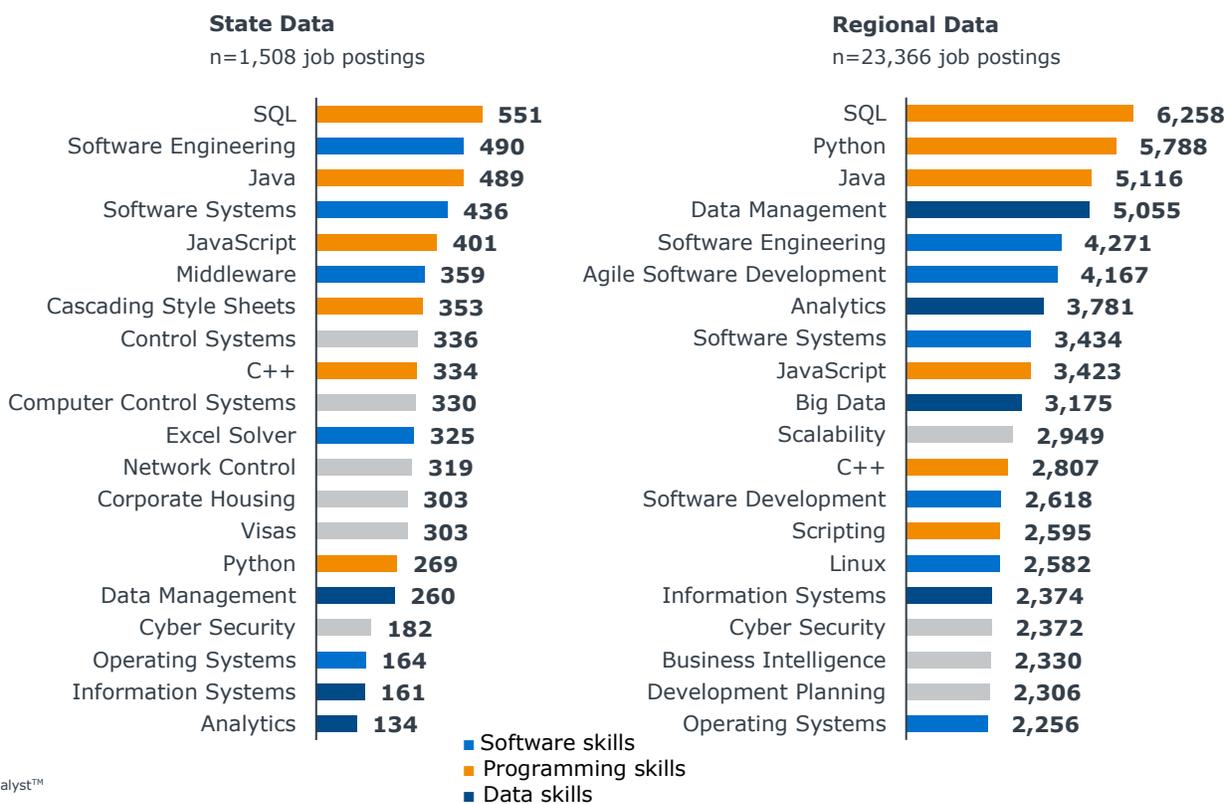
Confer Programming and Data Skills to Align with Employer Demand for Master’s-Level Computing Professionals

Administrators at **Wichita State University** should note the numerous programming skills employers frequently seek in master’s-level computing professionals when creating the curriculum for the Master of Science in Computing program. State and regional employers frequently seek master’s-level computing professionals with programming skills such as ‘SQL,’ ‘Java,’ and ‘Python.’ Employers seek candidates with skills in ‘SQL’ in 551 of 1,508 relevant statewide job postings (i.e., 37 percent) and 6,258 of 23,366 relevant regional job postings (i.e., 27 percent). ‘SQL’ represents the most frequently requested skill in state and regional job postings for master’s-level computing professionals from February 2018 to January 2019. However, contacts at **Georgia Institute of Technology** caution against developing courses or certificate programs around specific programming languages (e.g., Python). Administrators note employers prefer professionals capable of learning on the job as technology evolves quicker than curricula can adapt.

Between February 2018 and January 2019, state employers seek master’s-level computing professionals with skill ‘software engineering’ in 32 percent of relevant postings (i.e., 490 of 1,508 job postings). Similarly, regional employers seek master’s-level computing professionals with ‘software engineering’ skills in 18 percent of postings (i.e., 4,271 of 23,366 job postings). Additional software skills employers seek in master’s-level computing professionals include ‘software systems’ and ‘middleware.’ Employers also seek professionals with skills in ‘analytics’ and ‘cyber security,’ which align well with discussed specializations in the Master of Science in Computing at **Wichita State University** (e.g., data analytics, cyber security).

In-Demand Skills for Master’s-Level Computing Professionals

February 2018-January 2019, State and Regional Data⁸



8) Emsi Analyst™

Offer Stackable Certificates to Attract Prospective Students Interested in Low Time and Cost Commitments

The **Georgia Institute of Technology** offers a three-course certificate in Analytics in partnership with EdX MicroMasters.⁹ The certificate consists of three foundational courses in the full master’s curriculum (i.e., nine credits) that students may easily transfer to the full Master of Science in Analytics. Contacts at the Georgia Institute of Technology identify this stackable certificate as a strategy to interest career changers with a low-cost, low-commitment method to explore a new career path. Similarly, students at the **University of Maryland University College** may transfer all 12 credits from the Foundations in Business Analytics Graduate Certificate into the full Master of Science in Data Analytics. Contacts at the University of Maryland University College report most students in the certificate complete the full degree. Those who earn only the certificate report disinterest in the advanced programming courses required to earn the full master’s degree.

Marquette University and the **University of Utah** offer Master of Science in Computing programs that allow students to choose between different specializations. Contacts at Marquette University estimate half of incoming students apply for the specialization in “Big Data and Data Analytics,” the most popular specialization (i.e., approximately 30 of 60 total students). One quarter of students apply for the “Information Assurance and Cyber Defense” specialization and the remaining quarter apply to neither specialization. The University of Utah offers eight specializations within the Master of Science in Computing (e.g., Human-Centered Computing, Data Management and Analysis).¹⁰ **Eastern Kentucky University** requires students to choose a specialization from four options (e.g., Business Intelligence).¹¹

Specializations and Stackable Certificates in Master’s-Level Computing Programs at Profiled Institutions



Specializations

Marquette University

- Big Data and Data Analytics
- Information Assurance and Cyber Defense

University of Utah

- Computer Engineering
- Data Management and Analysis
- Graphics and Visualization
- Human-centered Computing
- Image Analysis
- Networked Systems
- Robotics
- Scientific Computing

Eastern Kentucky University

- Software Engineering and Computer Security
- Business Intelligence
- Computational Data Science
- Industrial Computing



Stackable Certificates

Georgia Institute of Technology

- MicroMasters Certificate in Analytics

University of Maryland University College

- Foundations in Business Analytics Certificate

9) Georgia Institute of Technology, “[Analytics: Essential Tools and Methods.](#)”

10) University of Utah, “[Graduate Program in Computing.](#)”

11) Eastern Kentucky University, “[Master of Science in Applied Computing.](#)”

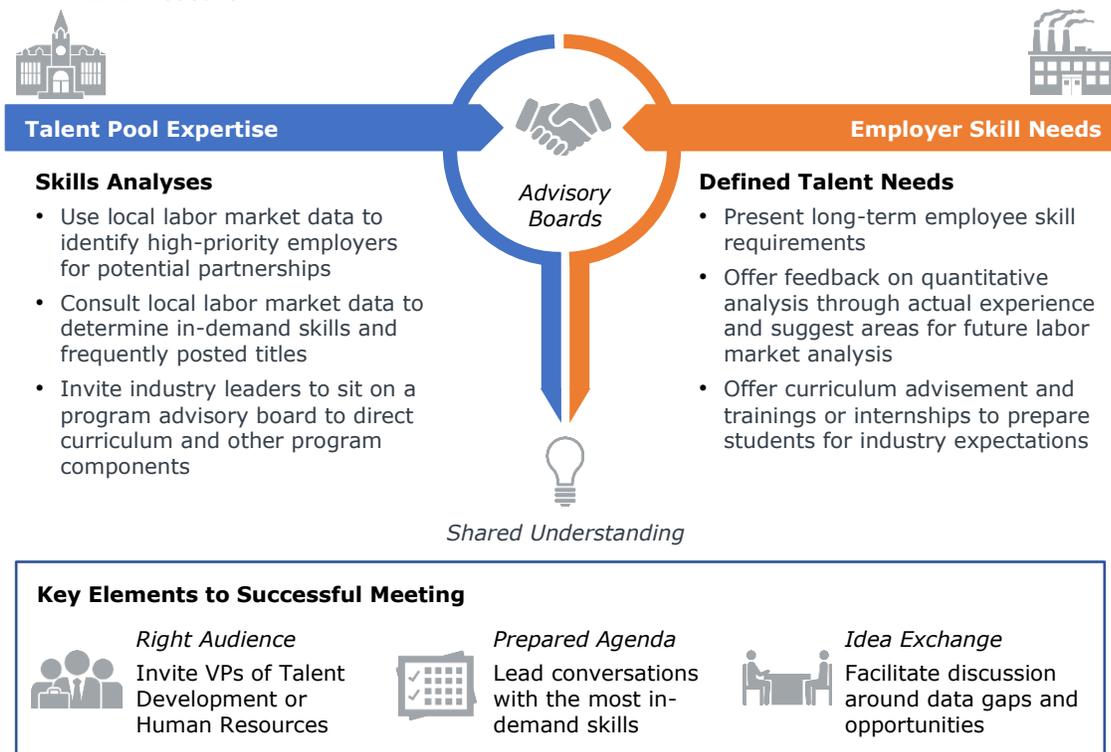
Invite Regional Employers to Participate in a Program Advisory Board to Establish Mentoring and Employment Opportunities for Students

EAB research indicates program administrators should encourage regional employers with demand for master’s-level computing professionals to join a program advisory board. An advisory board allows employers to advise on curriculum development and offer mentoring and capstone project opportunities for students. Partnerships through an advisory board encourage interactions with employers who may hire or promote program graduates, as administrators can demonstrate the program’s alignment with industry expectations. Share labor market data with participating employers to demonstrate administrators’ intent to prepare graduates for employer expectations and confirm an understanding of employers’ unique needs.¹²

Administrators at the **Georgia Institute of Technology** consult industry advisory boards, and contacts describe them as essential to program success. The participating organizations provide valuable insights for curriculum development and become vital sources of prospective online master’s students. Administrators at **Valparaiso University** advise cultivating industry partnerships before launching any program so students benefit from contacts and networking opportunities from the first cohort. The online iteration of **Marquette University’s** Master of Science in Computing launched in 2012 in an employer partnership with General Electric’s Edison Engineering Development Program, which still generates most online enrollments in the program in 2019. The **University of Maryland University College** advertises the “data analytics program is designed with input from leading employers to give you a competitive advantage in the job market.”¹³

Strategies to Develop Employer Partnerships for a Master’s-Level Computing Program

EAB Research¹⁴



12) EAB, “Critical Disciplines to Grow Employer Partnerships” 2018.

13) University of Maryland University College, “Data Analytics Master’s Degree.”

14) EAB, “Critical Disciplines to Grow Employer Partnerships” 2018.

5) Enrollment and Recruitment

Enrollment Trends

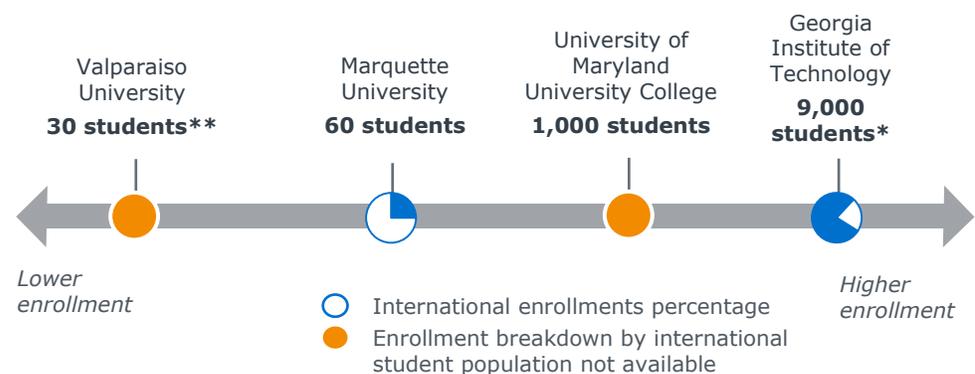
Administrators Report High Competition in Securing Enrollments and Suggest Caution in New Program Development

All contacts cite the computing field as extremely competitive with a few institutions enrolling thousands of students each, which may inhibit development of smaller programs. Contacts at **Valparaiso University** report a total enrollment of approximately 30 students since the Master of Science in Cyber Security launched in 2014. Contacts advise any institution to solidify a purpose and identify a target audience of prospective students prior to launching a new program in the crowded cybersecurity field. Administrators at **Marquette University** cite the creation of two specializations as a contributing factor to why enrollments have increased from 15 students in 2011 to 60 in 2019. The online Master of Science in Analytics at the **Georgia Institute of Technology** launched in 2017 and grew quickly. In 2019, the online Master of Science in Analytics at the Georgia Institute of Technology enrolls around 2,000 students. At the **University of Maryland University College**, contacts report enrollment in the five-year-old Master of Science in Data Analytics grew quickly to 1,000 students by 2017 and now remains stable even as competition in the field increases.

At Marquette University, international students represent 75 percent of enrollments in the Master of Science in Computing program and typically possess work experience in the information technology field. After finishing the Master of Science in Computing at the University, most international students remain in the United States to work under the Optional Practical Training program. International students from 48 countries represent 22 percent of students enrolled in the master's-level computing programs at the Georgia Institute of Technology. International students complete coursework online and remain abroad to find employment in their home country upon finishing the programs in Data Analytics and Cybersecurity. At Valparaiso University and the University of Maryland University College, international students represent a small percentage of total enrollment in profiled master's-level computing programs.

Total Enrollments in Master's-Level Computing Programs

Profiled Programs



*Enrollments in online master's programs in cybersecurity, analytics, and computer science.

**Estimated total enrollment from program launch in 2014 to 2019.

Advertise to Career Changers with Liberal Arts Educational Backgrounds to Secure Enrollments

All contacts report career changers enroll in profiled master's-level computing programs with experience in a range of liberal arts fields, drawn to the computing field by strong job prospects. Administrators at **Marquette University** approximate one third of students enroll in the Master of Science in Computing as career changers with previous education in a variety of fields (e.g., philosophy, law). To equip career changers with the background in computer science necessary to succeed in the Master of Science in Computing program and the professional world, Marquette University hosts a seven-credit summer 'bootcamp' program called Career Change Start MS in Computing ([COSMIC](#)). COSMIC participants learn introductory skills in programming and data structures before enrolling in the Master of Science in Computing Program. COSMIC began in 2017 and administrators at Marquette University estimate of the initial cohort of eight students, six will graduate from the full Master of Science in Computing in 2019.

At the **University of Maryland University College**, most students classify as career changers. Administrators note the Foundations in Business Analytics Certificate, which consists of three required courses from the Master of Data Analytics curriculum, attracts potential career changers as a quick method of sampling a new path. Career changers at the University of Maryland University College possess previous educational experience in fields such as history, psychology, or biology. However, contacts note most students were previously employed in some area of information technology or computer science. Similarly, administrators at **Georgia Institute of Technology** cite the Certificate in Analytics as a method of attracting prospective students who work outside of the technology industry. Online students at the Georgia Institute of Technology enroll from all 50 states and one quarter of students hold a previous master's degree, mostly in Science, Technology, Engineering, and Math (STEM) fields. At the Georgia Institute of Technology, most students, even those with liberal arts education backgrounds, possess some work experience in technological fields prior to enrollment.

At **Valparaiso University**, the Master of Science in Cyber Security frequently attracts career changers. Administrators at Valparaiso University report Master of Cyber Security students have backgrounds that range from STEM to ministry and seek career advancement in an exciting, evolving field. All students work full time and enroll in one to two classes per semester, sometimes taking semesters off.

Student Characteristics at Profiled Programs

Profiled Programs



The program at **Valparaiso University** most often enrolls **regional students** from the greater Chicago area, Indiana, and Michigan, although others enroll from across the country.



Students at the **University of Maryland University College** enroll at average **age of between 30 and 40**. Similarly, students at **Georgia Institute of Technology** enroll at an average age of **32**.



Students at **Marquette University** hold **diverse educational backgrounds** ranging from STEM to philosophy to law.



Female students compose **one third** of enrollments in the Master of Science in Computing program at **Marquette University**.

Emphasize Employment Prospects in Marketing Materials for Master’s-Level Computing Graduates to Secure Enrollments

Contacts at profiled institutions with moderate name recognition report marketing using a combination of professional marketing services and word of mouth from program alumni. **Valparaiso University** partners with recruitment agencies in different countries to increase name recognition and attract international students. Contacts at Marquette University report reliance on word of mouth from alumni to prospective students to maintain the enrollment pipeline. No interview contacts of profiled cybersecurity or analytics programs report attempts to differentiate computing from computer science in marketing materials. Administrators of the Master of Science in Computing program at **Marquette University** report the program’s title causes confusion among prospective students, who frequently question why the program’s title includes “computing” rather than “computer science.” In the Frequently Asked Questions section of the program website, administrators explain computing as a broad, interdisciplinary field and provide an industry definition of computing as evidence.¹⁵



Recommended Toolkit

[See EAB’s Word of Mouth Toolkit](#) to learn strategies for harnessing the full power of word-of-mouth marketing to expand the enrollment funnel.

EAB research indicates students respond positively to outcomes-based marketing messages. Programs that include labor market data and skills outcomes in marketing materials experience increased click-through rates and, ultimately, increased program applications and enrollments (e.g., common job titles, employers with high demand).¹⁶ The **University of Maryland University College** advertises the program “is designed to help prepare you for work in the high-demand field of data science and analysis...potential career fields include data mining [and] machine learning.”¹⁷

Marketing Strategies for a Master’s-Level Computing Program

Previous EAB Research

- 

Foster “word-of-mouth” marketing by encouraging current students and faculty to share program information with friends and colleagues. Additional EAB word-of-mouth marketing strategies can be found [here](#).
- 

Increase visibility with search engine optimization. Avoid the use of jargon in the program title to direct traffic to the program website. Refer to EAB’s search engine optimization [toolkit](#) to discover three ways to collect useful information about the words, phrases, and key search terms used to research educational offerings, compare institutional programs, and navigate to your website.
- 

Develop a strong website which provides prospective students with extensive information about the program and prompts students to inquire about the program (e.g., “Request Information, “Apply Now”).
- 

Maintain a strong social media presence. [EAB research](#) identifies social media features, such as student social media testimonials, as effective and inexpensive means to attract prospective students.

15) Marquette University, “M.S. in Computing Frequently Asked Questions.”
 16) EAB, “Competing on Student Outcomes to Attract Today’s Career Changer,” 2017.
 17) University of Maryland University College, “Data Analytics Master’s Degree.”

Appendix: Networking Contacts

Georgia Institute of Technology

Dr. Nelson Baker

Dean, Professional Education

404-385-5300

Nelson.baker@pe.gatech.edu

Marquette University

Dr. Thomas Kaczmarek

Director, Master of Science in Computing

414-288-6734

Thomas.kaczmarek@marquette.edu

Valparaiso University

Professor Nick Rosasco

Graduate Program Director, Master of Science in Cyber Security

219-464-5193

Nick.rosasco@valpo.edu

University of Maryland University College

Dr. Elena Gortcheva

Program Chair and Professor of Data Analytics

240-684-2537

Elena.gortcheva@umuc.edu