

# MASTER OF SCIENCE IN COMPUTER SCIENCE

## DELIVERED ONLINE

*Offered in collaboration with Udacity and AT&T*



Two years ago, Georgia Tech embarked on an initiative with the potential to change the very nature of higher education. In partnership with Udacity and AT&T, we sought to develop an online degree program in computer science worthy of a top tier university that was available to virtually anyone in the world at a price that was simply unheard of. In May 2013, when we announced our online MS in Computer Science program (OMS CS, for short), the reaction was immediate. Supporters heralded the project as one of the first steps into a new age of education, a bold effort that would be quickly followed by similar efforts. Critics, meanwhile, doomed OMS CS to failure before we'd enrolled our first student.

Two years, six semesters, 18 courses, and nearly 3,000 students later, we can now begin to survey the results, and the verdict is that OMS CS is succeeding—perhaps spectacularly. We have gone from zero students in Fall 2013 to nearly 2,900 two years later. We have received applications from more than 7,000 people and accepted better than half of them—representing a sea change in the admissions approach of a major university. We have created nearly 20 courses and are in the process of creating a dozen more. We have enrolled students from 79 countries spread across six continents, and in December 2015 we will congratulate the first graduates of this unprecedented program.

We are not yet prepared to declare victory. Launching and maintaining a program that services so many students has been a tremendous challenge—one that not every institution would be well advised to undertake. There has been no shortage of lessons learned along the way. Still, this program has reached an enrollment of multiple thousands barely 18 months since it began operation, and the feedback from students has been clear: OMS CS is no joke. It is a bona fide advanced degree in a sector that desperately needs more skilled workers.

At Georgia Tech, we believe OMS CS is part of the answer to the STEM challenge. I hope, after reviewing the information contained in this report, you will agree.

Best regards,

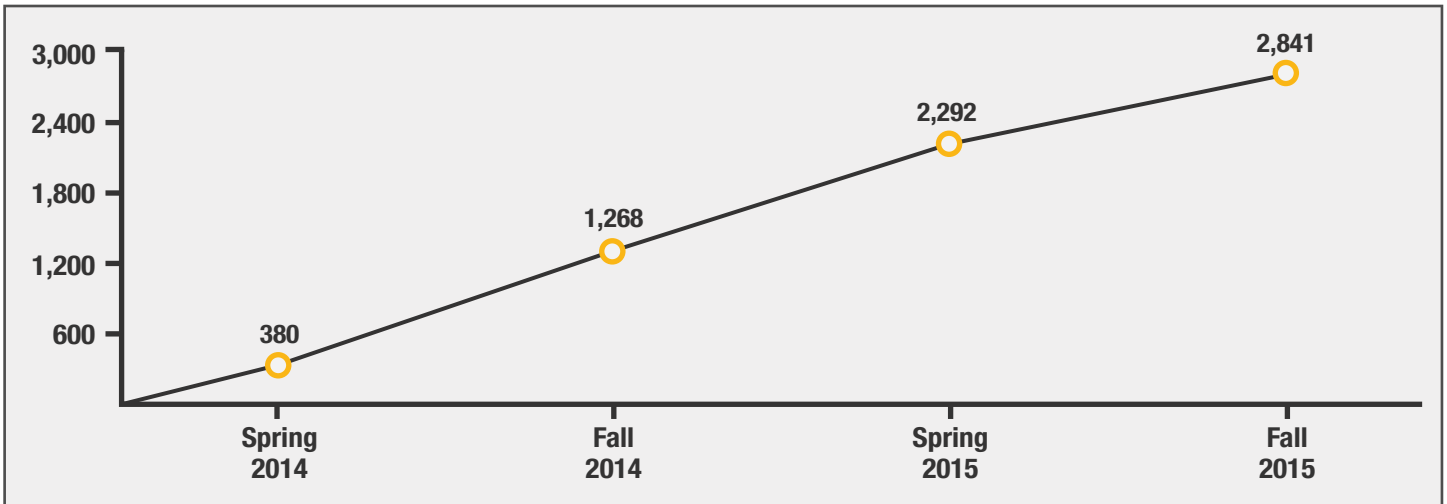


**Zvi Galil**

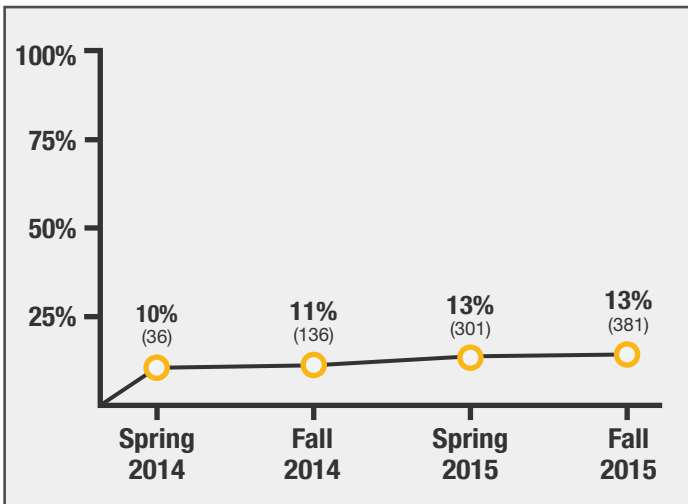
*The John P. Imlay Jr.  
Dean of Computing*

September 1, 2015

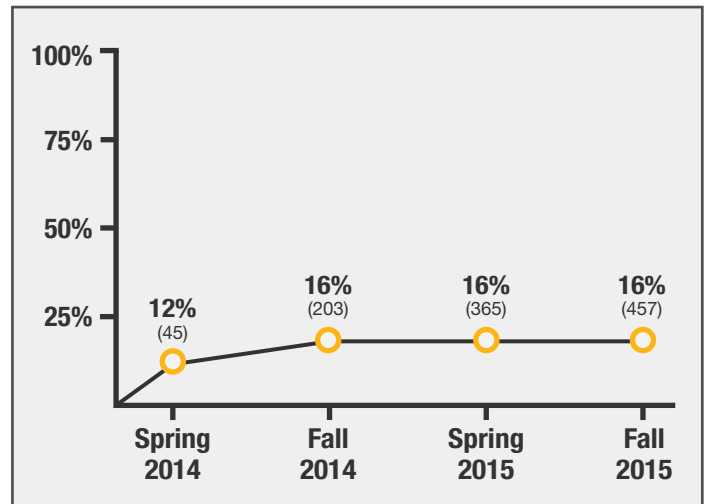
## ➔ Total Enrollment



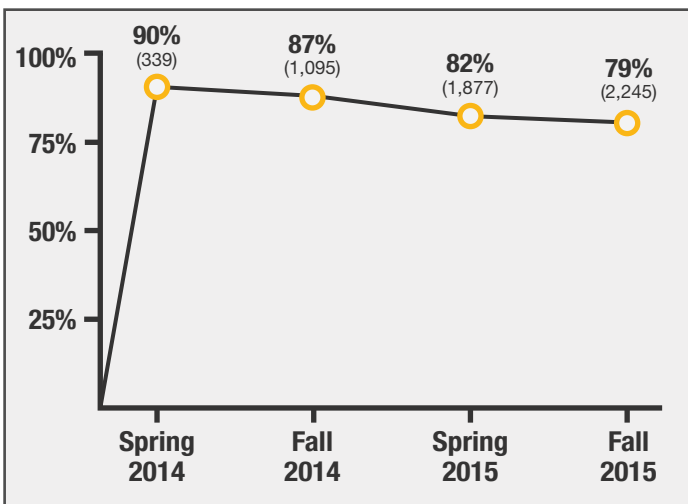
## ➔ Women (% of Total Enrollment)



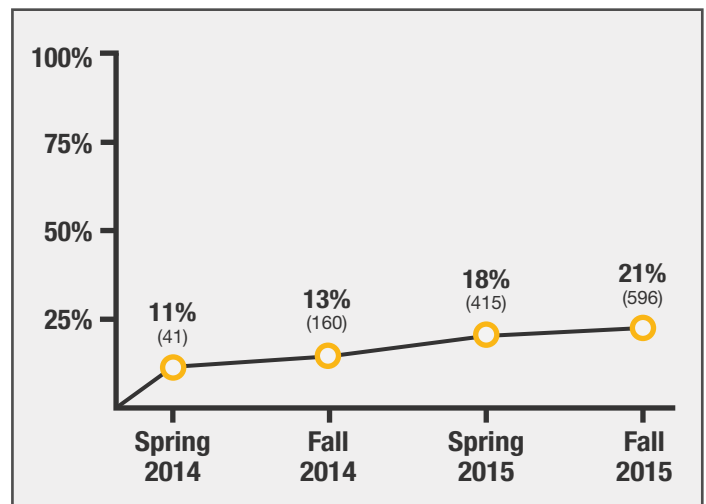
## ➔ Minorities (% of Total Enrollment)



## ➔ U.S. Citizens & Permanent Residents (% of Total Enrollment)



## ➔ International (% of Total Enrollment)



## → Course Listing (Fall 2015)

- **CS 4495 Computer Vision** (Aaron Bobick, Creator)
- **CS 6035 Introduction to Information Security** (Wenke Lee & Mustaque Ahamad, Creators)
- **CS 6210 Advanced Operating Systems** (Kishore Ramachandran, Creator)
- **CSE 6220 Intro to High-Performance Computing** (Rich Vuduc, Creator)
- **CS 6250 Computer Networks** (Nick Feamster, Creator)
- **CS 6290 High Performance Computer Architecture** (Milos Prvulovic, Creator)
- **CS 6300 Software Development Process** (Alessandro Orso, Creator)
- **CS 6310 Software Architecture and Design** (Spencer Rugaber, Creator)
- **CS 6440 Intro to Health Informatics** (Mark Braunstein, Creator)
- **CS 6460 Educational Technology** (David Joyner, Creator)
- **CS 6475 Computational Photography** (Irfan Essa, Creator)
- **CS 6505 Computability, Complexity and Algorithms** (Charlie Brubaker, Creator)
- **CS 7637 Knowledge-Based Artificial Intelligence: Cognitive Systems** (Ashok Goel, Creator)
- **CS 7641 Machine Learning** (Charles Isbell & Michael Littman, Creators)
- **CS 7646 Machine Learning for Trading** (Tucker Balch, Creator)
- **CS 8803-001 Artificial Intelligence for Robotics** (Sebastian Thrun, Creator)
- **CS 8803-002 Introduction to Operating Systems** (Ada Gavrilovska, Creator)
- **CS 8803-003 Special Topics: Reinforcement Learning** (Charles Isbell & Michael Littman, Creators)

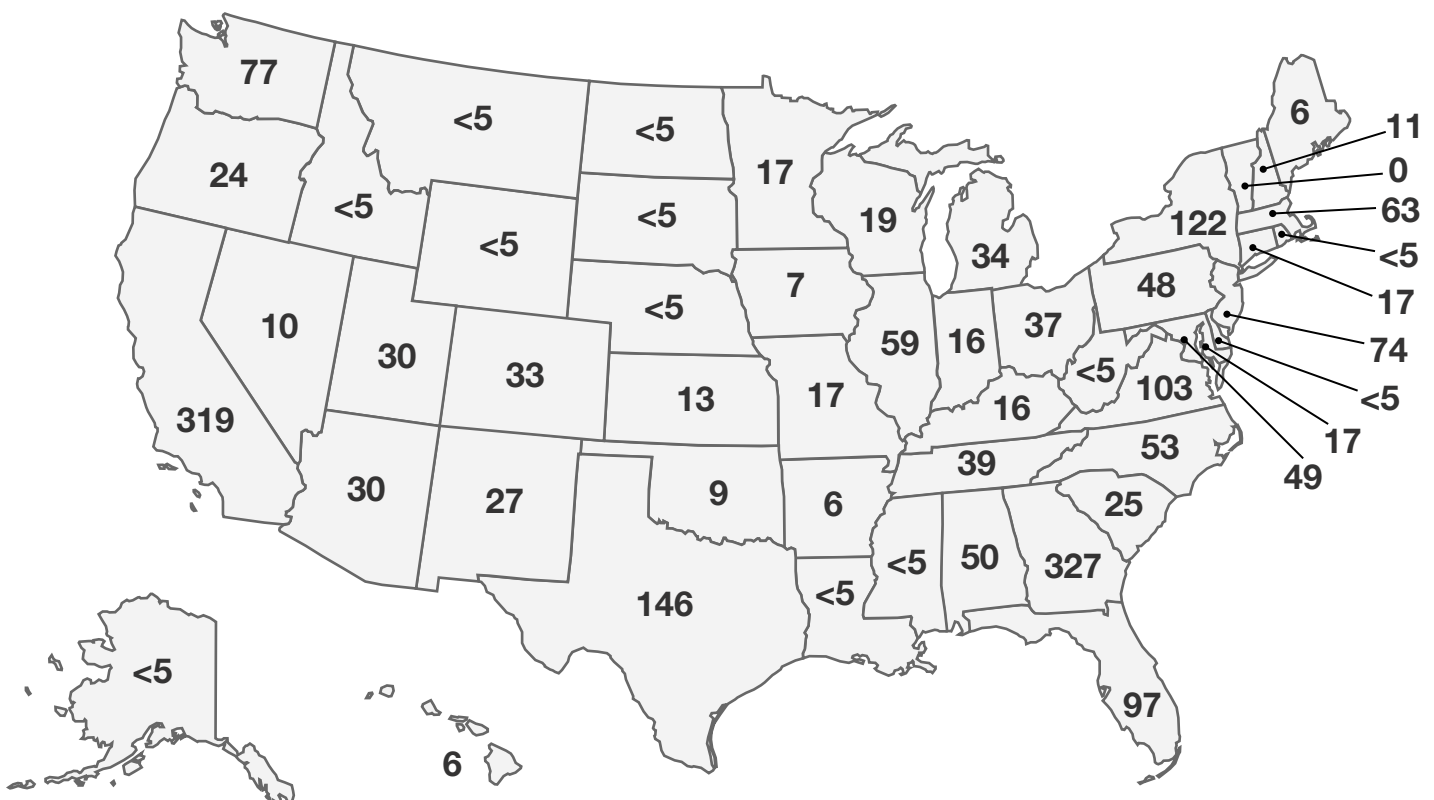
## → Average GPA (4-point scale)

Spring 2014	3.55
Summer 2014	3.67
Fall 2014	3.39
Spring 2015	3.50
Summer 2015	3.58

## → Top 20 Countries of Citizenship (Fall 2015)

USA	Brazil
India	Egypt
China	Indonesia
Canada	Australia
Nepal	Russia
South Korea	Taiwan
Pakistan	Singapore
Mexico	United Kingdom
Vietnam	Colombia
Kenya	Germany

## → Residency by U.S. State (Fall 2015)



# Program Visibility & Marketing

## ➔ Media Coverage

Since its announcement in May 2013, OMS CS has enjoyed unprecedented media coverage, which has served not only to support the program's marketing objectives but also has advanced Georgia Tech's reputation as a leader in educational innovation, accessibility, and affordability.

As of this writing, **the OMS CS program has received mentions in no fewer than 698 media articles published in print or online.**



### MEDIA HIGHLIGHTS

#### ***President Obama to discuss college affordability at Georgia Tech***

- Atlanta Journal-Constitution, March 9, 2015
- *[According to the White House] Georgia Tech is ideal for the event because its students have high job placement rates, the school's "promise program" offers debt-free educations to qualified in-state students, and it's among the first major universities to offer a master's degree in computer science exclusively online. Georgia Tech's online offering could serve as a model to help reduce the cost of education.*

#### ***Proving Ground for New Model of Higher Education***

- Author: Dean Zvi Galil
- Huffington Post, Sept. 29, 2014
- *The central innovation was not in the online delivery of the courses, nor in the fact that they lead to a complete degree. Rather, the key point is that the online nature of the degree is affirmed to be immaterial: the online classes are fully the equivalent of on-campus ones, in terms of both education and credentials, at a fraction of the cost. Having the coursework constitute a Georgia Tech master's degree is the only way we could have credibly put the Institute's reputation behind the rigor and quality of our online courses.*

#### ***What Georgia Tech's Online Degree in Computer Science Means for Low-Cost Programs***

- Chronicle of Higher Education, Nov. 6, 2014
- *Among all recent inventions that have to do with MOOCs, the Georgia Institute of Technology's online master's program in computer science may have the best chance of changing how much students pay for a traditional degree.*

#### ***One Down, Many to Go***

- Inside Higher Ed, June 6, 2014
- *Administrators at the Georgia Institute of Technology are optimistic but "not declaring victory" after one semester of its affordable online master's degree program in computer science. While the program has been well-received by students, administrators are still striving to solve an equation that balances cost, academic quality and support services. "We're not all the way there yet, but I couldn't ask for a much better start," [said] Zvi Galil, dean of the College of Computing.*

#### ***Master's Degree is New Frontier of Study Online***

- The New York Times, Sunday, Aug. 17, 2013, page A1
- *Higher education officials say they will be watching closely. "Georgia Tech is exceptionally important because it's a prestigious institution offering an important degree at very low cost with a direct connection to a Fortune 100 corporation that will use it to fill their pipeline," said Terry W. Hartle, the senior vice president of the American Council on Education. "It addresses a lot of the issues about universities that the public cares about. But how good and how transferable it is remain to be seen.*

#### ***The \$7,000 Computer Science Degree—and the Future of Higher Education***

- TIME.com, May 21, 2013
- *Online education has a reputation — some would argue a self-inflicted one — as an inferior substitute for brick-and-mortar scholarship. Georgia Tech is a good candidate to pioneer an online degree program that could challenge those assumptions about online education, experts say. Its academic bona fides — #5 ranking on U.S. News & World Report's list of top graduate engineering programs — give the initiative credibility.*



## ➔ OMS Website

The domain [omscs.gatech.edu](http://omscs.gatech.edu) serves as the central online marketing presence for the OMS CS program. Launched in conjunction with the program announcement in May 2013, the site has served as an informational resource for both prospective and current students regarding program information, course listings and descriptions, application and fee deadlines, and other topics, including a lengthy FAQ for prospective students.

### WEBSITE TRAFFIC

*From May 1, 2013 – Sept. 1, 2015*

- 944,837 sessions
- 547,359 users
- 2,801,221 pageviews
- 57.9% new sessions

### WEBSITE VISIT DEMOGRAPHICS

#### **Top 10 Countries**

- United States
- India
- Canada
- United Kingdom
- Germany
- China
- Australia
- Brazil
- South Korea
- Russia

#### **Top 10 Cities**

- Atlanta
- New York
- Chicago
- Dallas
- Bengaluru
- San Francisco
- Los Angeles
- Seattle
- San Diego
- Houston

## ➔ Email Marketing

Since OMS CS was announced, we have been delivering periodic email announcements to a growing email list that now numbers nearly 16,000 recipients. At first, these communications were pushed out at varying intervals to announce impending program news or deadlines (such as application deadlines). In early 2015 they were regularized for delivery on or near the first of each month and began to include a wider assortment of strategic content designed to market the program to target audiences, such as females and underrepresented minorities.

### BREAKDOWN OF EMAIL ANALYTICS

Mailing List Open Rate Average: 47.19%  
*(Industry Average Open Rate: 17.84%)*

## ➔ Conference Marketing

During 2014-15, the College of Computing marketed OMS CS directly to target audiences as sponsors of selected computing-related conferences, including:

- **MLConf** (machine learning), Sept. 19, 2014, Atlanta, Ga. Approx attendance: 170
- **Grace Hopper Celebration of Women in Computing**, Oct. 14-16, 2014, Phoenix, Ariz. Approx attendance: 7,800+
  - The College of Computing will provide partial scholarships for 20 OMS students to attend the 2015 Grace Hopper Celebration. These students will travel from all over the United States, as well as from locations like India.
- **SC14** (The International Conference for High Performance Computing, Networks, Storage and Analysis), Nov. 17-20, 2014, New Orleans, La. Approx attendance: 10,200
- **Women in Cybersecurity Conference**, March 27 & 28, 2015, Atlanta, Ga. Approx attendance: 470



## ➔ Social Media

Since program announcement, the College of Computing has maintained an active, official presence on two channels: Facebook and Twitter. During Summer 2015, we have been building a fourth presence on LinkedIn, which debuted in July. LinkedIn will serve as the hub for the program's digital marketing efforts going forward.

However these official channels only tell part of the story—perhaps even a small part. The real activity—that which socializes current OMS students as our best brand ambassadors and provides the shareable information that enables them to function as such—occurs in the private, student-run groups. These groups, increasingly customized according to student interests and demographics, are one of OMS CS' happiest surprises and a vibrant refutation to the claim that online degree programs can never enjoy the sense of community and mutual support that exists in an on-campus program.

### CURRENT MEMBERSHIP (Sept. 4, 2015)

<b>1,585</b> OMS CS Facebook likes (official)	<b>2,132</b> OMS CS Twitter followers
<b>870</b> OMS CS Facebook group student members	<b>2,646</b> Google+ group student members*

\* These members are only of the main Google+ community. There are also 56 sub-communities that support students who share geographical locations, demographic characteristics, academic interests, and even primary languages. For example, Nerdy Bones, a group dedicated to female OMS students, has 120 members.



## ➔ OMS Speaking Appearances

Since the OMS announcement in May 2013, the College has received many requests to speak at universities and conferences, before government groups and think-tanks, in locations all around the world. Dean Zvi Galil and Senior Associate Dean Charles Isbell have delivered invited talks about OMS at the following:

- 2nd International Summer Workshop on IT Education and Research (University of Applied Sciences Upper Austria, Hagenberg, Austria)
- American Enterprise Institute (Washington, D.C.)
- China Education Association for International Exchange (Beijing) (pictured above)
- Columbia University
- ETH Zurich (Zurich, Switzerland)
- Florida International University
- Haifa University (Israel)
- Harvard University
- Hyderabad, India
- MIT
- University of Paris Marne-la-Vallée (France)
- President's Council of Advisors on Science & Technology (Washington, D.C.)
- Seoul National University (Korea)
- Shanghai Jiao Tong University (China)
- Stanford University
- University of Rome (Italy)
- University of Siena (Italy)

# Impact

## ➔ Changing Higher Education

The announcement of OMS made an immediate impact in and around the world of higher education. Peer universities, accreditors, journalists, prospective partners, industry HR & training executives, and government regulators and legislators all reached out to Georgia Tech seeking further information about this groundbreaking program.



- Charles Isbell (pictured above) was invited to testify on Sept. 18, 2013, before the U.S. House Subcommittee on Higher Education and Workforce Training in a hearing titled, “Keeping College Within Reach: Improving Access and Affordability through Innovative Partnerships.”
- In May 2015, the University of Illinois announced a new “iMBA” program in collaboration with online education provider Coursera. The first degree offering comparable to OMS CS in its combination of MOOC-style delivery and reduced cost, the Illinois iMBA was expected to cost each student about \$20,000 for the entire program, compared to \$9,000 (part-time) and \$22,000 (full-time) per semester for students enrolled in Illinois’ on-campus MBA program.

## ➔ Student Feedback

“Three semesters deep, I must say that the program does a phenomenal job of making distance a complete non-issue. Between group lecture viewings, live office hours, and an online forum, there is every opportunity to be as involved as (or even more than) an on-campus class. And equally impressive as the classes have been my fellow classmates. It has been amazing to have an instant network of helpful and talented professionals who are able and willing to assist in the learning process.”



**Shipra De**  
*OMS CS student*

“As someone who is in the program’s first cohort, I can tell you that my initial impressions have just been phenomenal. The instructors did an amazing job with their videos, and the content pushes the envelope.

The initial cohort of people are also just incredible—very humbling to be in such accomplished company.”



**Nate Payne**  
*OMS CS student*

“Trying to pursue an M.S. CS degree while on duty is extremely difficult. A traditional program is nearly impossible, as most Army installations are not located near universities offering the program. And even if they did offer it, the class schedule would be incompatible with military life.

The Georgia Tech OMS CS program is the only program flexible enough to work within my schedule and cost effective enough that I can afford to pursue my degree.”



**Michael Brown**  
*OMS CS student, U.S. Army*

“The coursework I’ve done so far is very relevant to my work role. I work regularly with information systems, solving problems with and within those systems. Having a rigorous education in computer science is very beneficial. It allows me to understand my operating environment more thoroughly. It allows me to think of relevant solutions more quickly.”



**Lt. Landon Barnes**  
*OMS CS student, U.S. Army*



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