



## the promise and power of IMSA

IMPACT REPORT 2017

# 30 years of transforming STEM education: a letter from our president

The State of Illinois launched the Illinois Mathematics and Science Academy (IMSA), which is recognized as the world's leading teaching and learning lab for imagination and inquiry, in collaboration with business, education, and science leaders. For 30 years, IMSA has pioneered the future of science, technology, engineering, and math (STEM) education through its two legislative charges: 1) to provide a uniquely challenging education for students talented in the areas of mathematics and science and 2) to stimulate further excellence for all Illinois schools in mathematics and science. IMSA champions these goals through:

- ➔ **New STEM teaching models:** leading the charge to continually innovate K-12 STEM education, from problem- and inquiry-based learning to innovation, entrepreneurship, and tackling the world's grandest challenges.
- ➔ **Residential education:** helping nearly 6,000 top 10<sup>th</sup> through 12<sup>th</sup> graders from 95 Illinois counties to date reach their fullest potential and apply their passion and skill for math and science to advance the human condition.
- ➔ **Student and educator outreach:** creating a strong and diverse STEM talent base through teacher training, turnkey STEM curricula development, and innovative student enrichment programs.

Please join us in celebrating our 30th anniversary—30 years of significantly contributing to educational innovation and excellence in Illinois and beyond.

Sincerely,



José M. Torres, PhD, President

## a recognized global leader and innovator



Ranked the #2 public high school in the United States in 2016 by NICHE.com—a ranking considered to be similar to the *U.S. News and World Report* college rankings



Dubbed “Hogwarts for Hackers” by *WIRED* magazine



Named the 2009 Star Innovator Award winner as the nation's top math and science program by the Intel Corporation

Ranked among the top high school programs in the nation for placing graduates in Ivy League and other highly selective universities by:



THE WALL STREET JOURNAL.

Featured for its groundbreaking work by global media outlets, including:



Newsweek

The New York Times

# 2017 IMSA annual profile

## residential academy: the promise of a unique education

**650** residential academy students annually

IMSA's diverse enrollment includes students from 51 Illinois counties currently and a breadth of racial/ethnic, urban/rural, and economic backgrounds.

50% of students are male and 50% are female.



**#1** best high school teachers in the United States as ranked by NICHE.com, 2016

More than 50% of IMSA faculty have a PhD.

100% have a master's degree.



**84%** of IMSA students conduct research

A significant majority of graduating seniors have engaged in hands-on, experiential research on campus or at universities and research institutions in Illinois during their tenure at IMSA.



**43,333** hours of community service annually

IMSA students volunteer 43,333 hours to Illinois nonprofit organizations each year.



**2,400** internship hours at local startups

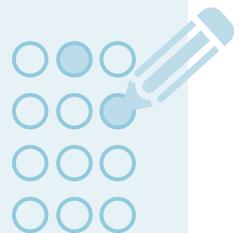
IMSA students will provide 2,400 hours of free internship time to Chicagoland startups this year, helping accelerate business growth.



**32.2** composite ACT score

IMSA student scores are significantly higher than the average Illinois college-bound senior score of 20.8.

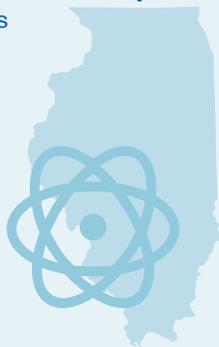
IMSA students average a 735 math SAT score, which puts them in the 97th percentile.



## student and educator outreach: the power of a STEM pipeline for Illinois

**6,477** Illinois student participants reached by IMSA outreach programs

Illinois students in grades 3–12 participate in a variety of IMSA after-school and summer STEM outreach programs that bring the IMSA teaching approach to students at sites around the state.



**260** participants are projected to benefit from IMSA's PROMISE diversity outreach program this year

The IMSA PROMISE program serves students in grades 5–9 from underrepresented and economically disadvantaged backgrounds with the goal of identifying and supporting future residential students through education enrichment opportunities.

80% of 9th grade PROMISE students applied to IMSA's residential academy last year, and 50% were admitted and enrolled.

IMSA PROMISE

**1,049** Illinois teachers have participated in IMSA's STEM professional development outreach programs

IMSA's award-winning Fusion program, and other educator professional development programs, provide Illinois teachers with engaging methods and STEM content they can readily apply to motivate their students.



**66%** of schools participating in the Fusion STEM professional development program serve low-income students

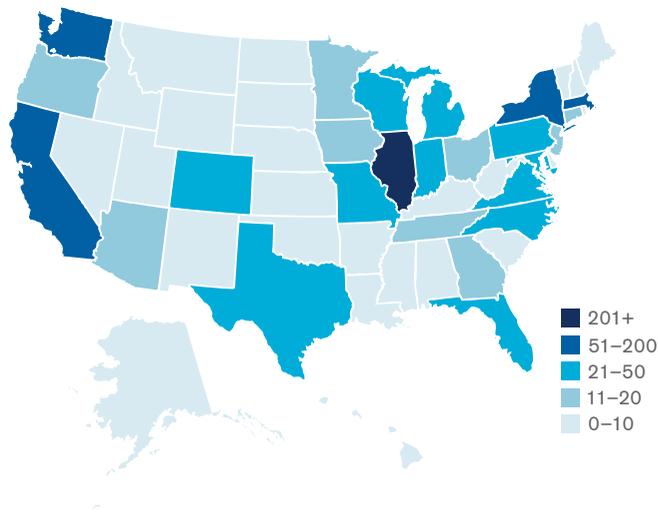
66% of IMSA's Fusion training development programs are conducted for teachers that teach in schools that primarily enroll low-income students.



# alumni impact on Illinois and the world

**Where are they now?** IMSA supplies a much-needed workforce of STEM innovators in Illinois, the United States, and countries around the world. Highlights of this alumni impact were captured through a recent survey of 1,651 alumni.

## Number of IMSA alumni living in each US state



## Alumni earn higher-than-average salaries

IMSA alumni median income is two to three times more than that of Illinois and the United States.

# \$101,000–\$150,000

is the median income range reported by IMSA alumni, compared with \$57,000 for Illinois and \$54,000 for the United States.



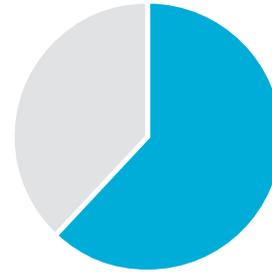
## Giving back

# 97%

 of IMSA alumni donate their time or money

IMSA alumni donate time and dollars to charities that support animal welfare, arts and humanities, the Boy Scouts and Girls Scouts, education, health and human resources, human rights, music, religion, and youth sports.

## The majority of alumni report working in STEM careers



# 62%

 of alumni work in a STEM field

And many more IMSA alumni bring the scientific thought process to diverse career paths, including banking, education, law, and policy.

## Alumni lead Illinois businesses

# 24

 presidents and CEOs in Illinois

At least 24 IMSA alumni currently serve as the president or CEO of Illinois companies.

## Articles published in peer-reviewed journals



# 1,777

 articles published by IMSA alumni

IMSA alumni regularly publish articles, scholarship, and research in such fields as alternative energy, dermatology, education, engineering, epilepsy, law, neuroscience, organic chemistry, orthopedic surgery, and polyelectrolytes.

## Patents held by IMSA alumni

# 644

 patents held by IMSA alumni

IMSA alumni hold patents across 100 disciplines, including artificial intelligence, biotechnology, cell biology, chemistry, computer software, construction, consumer electronics, e-commerce, medicine, mobile communications, nanotechnology, physics, robotics, software, toys, vehicle automation, and wastewater control.

This rate is 55 times the Illinois per capita patent rate.\*

## Alumni holding doctorates

# 13%

 of IMSA alumni have earned a PhD

According to 2013 US Census data, this rate is eight times the national rate.

\*Patents issued per capita by state, StateMaster.com, accessed March 22, 2017.

# STEM outreach: impact on Illinois students and educators

## educators

IMSA's outreach efforts address the critical need to provide Illinois teachers—many of whom did not take math or science in college—with the confidence, content knowledge, curricula, and training required to inspire students to pursue the STEM skills and careers that drive our 21<sup>st</sup> century knowledge economy.



### Award-winning approach to building the next generation of STEM educators

IMSA's Fusion STEM teacher professional development program has been recognized by **Bayer, Boeing, the Chicago Innovation Awards, and Change the Equation**—a national, corporate-led initiative including **Amazon, BP, Microsoft, Motorola Solutions, and State Farm** focused on providing a high-quality STEM learning program to every K-12 community in the United States.

More than  
**60,000 hours**  
of STEM educator professional development in the past five years

**91%** of teachers participating in Fusion last year demonstrated enhanced classroom teaching methods.

## students

IMSA engages youth in STEM programming that helps build innovative thinkers and supplies the workforce with a strong and diverse talent pipeline.

More than  
**5,700** STEM summer camp participants

Over the past five years, more than 5,700 students have participated in IMSA's weeklong summer camps at six Illinois sites in Aurora, Belleville, Chicago, and Springfield. These camps, including Game Day STEM and MYTHconceptions, allow students to engage in hands-on STEM learning.

More than  
**3,300** STEM workshop participants

Over the past five years, more than 3,300 students have participated in IMSA's half-day, hands-on FUNshops that ignite their interest in STEM.

More than  
**800** high school mentorship participants

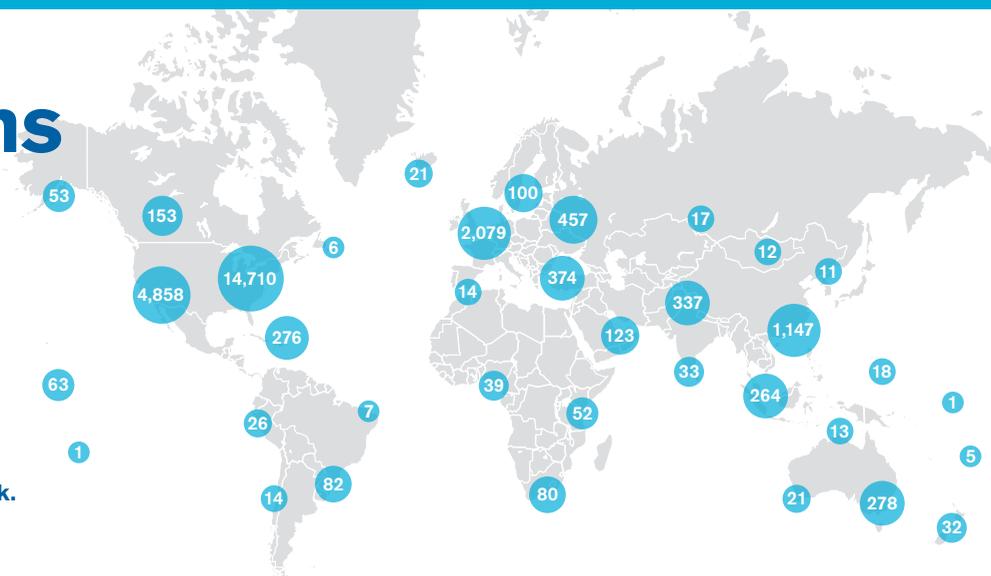
Over the past five years, more than 800 IMSA and other high school participants have given back by mentoring middle school students through the IMSA Allies "Kids Teaching Kids" after-school and summer mentoring program.

## global

More than  
**150,000 items**

of IMSA teaching and other scholarship downloaded from more than **160 countries** over the past four years

IMSA's lesson plans for innovation and teaching are available electronically worldwide through the University of Berkeley's Digital Commons Network. **IMSA is the sole secondary education institution with material on the Digital Commons Network.**



# IMSA inquiry-based education: the power of problem solving

**Inquiry-based learning is the heart of IMSA.** Students follow their curiosity and learn to think differently and act boldly through engagement in a real problem. This theme shapes the IMSA curriculum in a range of advanced courses from biophysics to political theory—offerings that extend far beyond traditional high school offerings.

IMSA students also spend **20% of their time outside the classroom** making meaningful contributions and working to solve problems in a breadth of fields—from artificial intelligence to microbiology to sociology. Students have applied their learning in the real world through collaborations on- and off-site at more than 70 world-leading institutions, such as:



## Developing leaders who change the world

It is through IMSA's signature educational approach that young minds are developed into leaders who can change the world through their life's work. Illustrative examples include:

### Steve Chen, '96 building an increasingly connected world

As cofounder and chief technology officer of YouTube, Steve Chen empowers people of all backgrounds to connect, share information, learn, and be entertained. His work has fostered personal expression, a broadening awareness of social issues, and the proliferation of knowledge to a global community.

### Dr. Gabriel Demombynes, '89 shining a light on global poverty issues

As a senior economist in the Hanoi office of the World Bank, Dr. Demombynes works and publishes on poverty issues, arguing for the greater use of the scientific method in evaluating international development programs. His work has been cited by the *Economist*, the *Washington Post*, and the White House.

### Claudia Flores, '93 advancing human rights in developing nations

As a legal advisor to the United Nations, Ms. Flores advised governments on constitutional and legislative reforms to increase legal protections for human rights and civil liberties. Currently, she runs the University of Chicago International Human Rights Clinic, which promotes social and economic justice in the United States and globally.

### Dr. Princess Imoukhuede, '98 unraveling the biology of complex disease

Dr. Imoukhuede's award-winning research at the University of Illinois focuses on how the body controls blood vessel formation with the goal of developing treatments for more than 70 diseases, including breast cancer and cardiovascular disease. Professor Imoukhuede was the first African-American woman to earn a bioengineering PhD at Caltech.

### Dr. Aaron Parness, '00 engineering the future of space exploration

Dr. Aaron Parness, a lead researcher for NASA's Jet Propulsion Laboratory, is utilizing engineering and materials science to create gecko-inspired robots that use tiny artificial hairs to climb the exterior of the International Space Station while conducting inspections and repairs.

### Sabrina Gonzalez Pasterski, '10 expanding our understanding of the universe

Generating buzz as the "next Einstein" in *Inc.* magazine and other publications, Sabrina Gonzalez Pasterki's research on black holes and space-time has been cited by the likes of Stephen Hawking. She has been recognized by *Forbes* and *Scientific American*'s "30 under 30."

# Leading the way for tech innovation and entrepreneurship in Illinois

IMSA inspires the next generation of entrepreneurs to innovate solutions to the world's challenges and develop products and companies that drive economic prosperity.



- Over the past four years, more than **120 IMSA students** have learned startup how-tos from the inside while providing more than **11,000 hours** of free internship time—valued at more than **\$165,000**—at Illinois innovation hubs like 1871.
- Nearly **25%** of IMSA's TALENT entrepreneur program students go on to launch their own startup or join a startup team, even though many are still in high school or college.
- IMSA's **Power Pitch** is an annual competition for the best teen startup ventures. The 2014 winning company, an anti-cyberbullying app called ReThink, went on to strike a **\$100,000** deal on *Shark Tank*. The company Tweetsense, a 2015 top finisher, received media attention for **predicting Brexit and the outcome of the 2016 US presidential election** using social media sentiment analysis.
- IMSA's **IN2 innovation center** is a first-of-its-kind space in Illinois that allows **Illinois companies and nonprofits to collaborate with IMSA students** on new technologies and business ventures.

## IMSA alumni drive the Illinois technology sector

IMSA alumni have been at the center of Illinois' ascendance over the past decade from technology afterthought to global technology hub. Alumni contributions include:

- **Creating high-value Illinois tech companies:** Four IMSA alumni—**Andrew Baptist ('94), Greg Dhuse ('99), Dusty Hendrickson ('01), and Ethan Wozniak ('99)**—are responsible for 212 of 350 patents generated by data storage leader Cleversafe, one of Chicago's hottest tech companies. This patent portfolio is in the top 10 globally and helped drive the \$1.3 billion sale of the company to IBM in 2016—one of Illinois' largest tech startup exits ever.
- **Positioning Illinois as a tech destination:** E-commerce business ShopRunner was one of the first tech companies to relocate its headquarters to Illinois when **Sam Yagan ('95)** was named CEO in 2016. Sam is also the cofounder of OkCupid, SparkNotes, 1871-based startup accelerator Techstars Chicago, and venture investment fund Corazon Capital.
- **Catalyzing socially minded, business-focused tech startups:** Impact Engine in Chicago, run by **Jessica Droste Yagan ('95)**, has \$11.7 million under management to invest in early-stage, for-profit technology businesses that improve economic empowerment, education, health, and resource efficiency. The 29 companies Impact Engine has invested in employ more than 240 full-time employees, and 75% were launched by women or minority founders.
- **Creating public-private partnerships that foster manufacturing technology and innovation:** **Dr. Jeff Margolis ('00)** played lead roles in delivering to Illinois the \$320 million Digital Manufacturing and Design Innovation Institute, tasked with making US manufacturers more competitive, and the new mHUB physical product innovation center that is already home to more than 100 startups.

IMSA alumni have defined and redefined technology through their contributions in launching global, leading companies and products:



**“I am grateful to IMSA for showing me that the most important things someone can possess are a curious mind and a giving heart.”**

—Omotayo Balogun, '11

**IMSA opened many doors that just aren't present for many downstate students, even in private schools. My time at IMSA challenged me to think in ways that still make me stand out and support my success. If every student had access to the level of quality and caring in their education that IMSA provides, the world would be a much better place to live today.**

—Jennifer Holloway, '97

**IMSA Fusion has helped me remember my passion for teaching. Under Fusion, students are in charge of leading the conversation, asking the difficult questions, and searching for the answers. With the proper support, students can tackle nearly any issue if it is meaningful to them.**

—Sarah Phelps, Illinois educator

*“Living and learning among the fearless and dynamic teachers and students at IMSA encouraged me to develop the drive and emotional stamina to chase opportunities that offered the potential to change the world.”*

—James Wong, '90

*“There is no experience like IMSA. It changed the way I think and made me stronger, smarter, and better.”*

—Molly Cuka, '14

*“Without IMSA, I would've had a much more difficult time realizing that my ultimate role as a global citizen is to leave mankind better than I found it, in whatever ways possible. IMSA has allowed me to experience a life blended in volunteering and scientific curiosity.”*

—Gaurav Singh, '08

*“IMSA enabled me to acquire the skills and character traits necessary to pursue and complete a PhD in computer science and become a founder/entrepreneur where I was able to create engineering and science jobs in Illinois and beyond. I would not be where I am today without IMSA.”*

—Jerome Budzik, '95

*“Simply put: It [IMSA] opened my world, and for that I am forever grateful.”*

—Jade Martin, '10



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