

FALL 2018

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Illinois Mathematics and Science Academy

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Mission

To "ignite and nurture creative, ethical, scientific minds that advance the human condition"



José M. Torres, PhD

From the President

Buoyed from the energy and success of hosting the 14th Annual International Student Science Fair (ISSF) this past summer and outside recognition by niche.com as the #1 Public High School, the 2018-2019 Academic year is moving at a robust pace.

We are making continuous progress toward accomplishing our 2022 Impact and Outcomes and have established four priorities for the year. One priority is to continue integration of the United Nations 17 Sustainable Development Goals into our curricular activities and learning experiences as well as our research programs (SIR), leadership programs (LEAD) and innovation efforts (IN2) across the Academy.

Another priority relates to our foundational philosophy of Equity and Excellence that guides all our efforts. While we continue to seek and support talented students throughout Illinois with a passion and interest in mathematics and science, we are making a concerted effort to recruit and support high ability, low income students.

A third priority is to develop and implement an International Strategy that will assist us in meeting our Impact and Outcomes. This may include building on ISSF to bolster IMSA's reputation globally, determining which international invitations to accept and pursue, and preparing IMSA's infrastructure and processes to enroll non-Illinois students. The effort comes on the heels of modifications to the IMSA Law, passed by the Illinois General Assembly and signed by the Governor on August 17, 2018, that permits the enrollment of students who have completed the 8th grade as well as non-Illinois students who have paid required tuition, room and board fees. For more information on changes to the IMSA Law, visit imsa.edu/SB2939.

A final priority, IMSA Innovation Campus - Phase 1, is to engage our IMSA community in dreaming about a new hall, including thinking about its design, and identifying and securing financial resources to make this dream a reality.

To stay abreast of Academy activities and the progress that we are making to meet our strategic goals, please reference my Personal Reflections and Board reports at imsa.edu/leadership.

While we are focused on exploring new and different ways of leading, ideating and solving problems, we pause with heavy hearts to remember the lives of two members of our IMSA Community: Dr. Leon Lederman who died on October 3, 2018 and Dr. Vandana Chinwalla who died on May 21, 2018. Dr. Lederman, founding father of IMSA and Nobel Laureate in Physics, was the former Director of Fermi Lab, husband, father, teacher, and mentor. Dr. Chinwalla, wife, mother, daughter, and sister, was a research faculty and lead instructor for our Student Inquiry and Research Program (SIR).

Respectfully,

José M. Torres, PhD
President

IMSA has been named the
#1 Public High School in
America in Niche.com's
2019 rankings.



Honoring the Founding Father of IMSA and Nobel Laureate

Dr. Leon Lederman

July 15, 1922 – October 3, 2018



The IMSA Fund has established the Leon Lederman Founders Fund to honor the life and work of Dr. Lederman. Tax-deductible gifts directed to the Fund may be made online at imsa.edu/giving.

From the very beginning, Dr. Leon Lederman was IMSA's biggest champion. Similar to how a father feels for his own children, Dr. Lederman always had much love, affection and praise for IMSA, and high expectations for its faculty, staff, students and alumni. Since 1985, he was able to witness those successes firsthand and see the results of his tireless efforts on IMSA's behalf.

In addition to having a profound impact for decades on the national and international scientific and educational communities, Dr. Lederman had a deep and meaningful impact on the hearts and minds of thousands of past and present students of the Illinois Mathematics and Science Academy (IMSA) in Aurora, Illinois.

Because of Lederman's painstaking and tireless early efforts, IMSA alumni have gone on to become scientists, engineers, doctors, entrepreneurs and educators, fulfilling the dream Lederman had for IMSA students. IMSA was created in 1985 and opened its doors in 1986, graduating its charter class in 1989.

Lederman's IMSA Legacy

Thanks to Dr. Lederman's worldwide reputation and influence, current and former IMSA students were able to brush shoulders with great minds such as Nobel Laureates Dr. Dudley Herschbach and Dr. Jack Steinberger, U.S. Poet Laureate Robert Pinsky and Scientist Marvin Minsky, through the IMSA Great Minds Program®, launched in 1998 by Lederman.

Current and past students were fortunate to receive the once-in-a-lifetime opportunity to learn from one of the world's great scientific minds and to come to know him on a more intimate, personal level through his campus interactions in venues such as Lunch with the Laureate or the IMSA Great Minds Program.

In addition to community lectures, dialogues and interactive seminars, Dr. Lederman inspired students to take on ambitious projects that resulted in increased understanding of scientific, mathematical and technological world issues.

One such project, the book *Portraits of Great American Scientists*, gave 15 IMSA students the once-in-a-lifetime opportunity to publish their first book before the age of 19 and to help educate youth about the field of science as a career choice.

The book featured 15 biographies including those of astronauts Sally Ride and Story Musgrave, Nobel Laureates Dr. F. Sherwood Rowland and Dr. Charles Townes and world-renowned dinosaur hunter Dr. Paul Sereno. Just like a proud father, Lederman, who was co-editor of the book with IMSA Coordinator of Student Inquiry and Research Dr. Judith Scheppler, expressed his enthusiasm and pride about the project.

Lederman Accolades and Honors

With a career that spanned more than 60 years, Lederman became one of the most important figures in the history of particle physics. He was responsible for several breakthrough discoveries, uncovering new particles that elevated our understanding of the fundamental universe.

At Fermi National Accelerator Laboratory, Dr. Lederman became a leader in launching programs to encourage young people to pursue their scientific interests. His deep concern for the quality of science and mathematics education in Illinois, and his intense commitment to motivate students to pursue careers in science, led him to propose the concept of Illinois Mathematics and Science Academy—a place that would inspire and challenge students of exceptional talent.

Throughout his lifetime, Dr. Lederman has been honored by Presidents and Kings worldwide for his contributions to science including President Lyndon B. Johnson (National Medal of Science); President of Israel Chaim Herzog (Wolf Prize in Physics); President Bill Clinton (Enrico Fermi Award); and King Carl Gustaf XVI of Sweden who presented Lederman with the Nobel Prize in Physics.

Thanks to his life's work – his passion, dedication and contributions to science literacy, and scientific breakthroughs, the Lederman Legacy will shine brightly always.

Dr. Lederman died peacefully on Oct. 3 at a nursing home in Rexburg, Idaho. He was 96. He is survived by his wife of 37 years, Ellen, and three children, Rena, Jesse and Rachel, from his first wife, Florence Gordon. For more information on the life and work of Lederman, visit digitalcommons.imsa.edu/lederman/.

Year of Inquiry Explores Strategies to Improve Well- Being of Students

IMSA's academic program prepares students to become bold inquirers, problem solvers and integrative thinkers. It challenges them to question, creatively probe, take risks and test and support their ideas. IMSA is applying this same inquiry-based approach to a year-long investigation of the mental health and well-being of students.

"IMSA's "Year of Inquiry" is an in-depth examination aiming to identify both the scope of and potential solutions to the challenge of IMSA student mental health and well-being," says Dr. Amber Stitzel-Pareja, Executive Director of Institutional Research. Members of the IMSA community are forming a working group which will consist of staff members, faculty members, and students. The working group will develop research questions and a research plan. During Spring 2019, members of the working group will work to synthesize and compile the findings into a presentation and report. The findings will be presented and disseminated at the end of the 2018-2019 school year.

The topic was selected based on a 2018 Challenge Success Survey administered to IMSA students. The survey was developed in 2009 by Stanford University and measures academic engagement, homework, extracurricular activities, academic integrity, student support, student physical and mental well-being. Findings of the IMSA survey indicated most of current IMSA students reported at least one stress-related health system over the previous month: exhaustion, difficulty sleeping, headaches, sweating, weight gain/loss and/or stomach problems.



The American Psychological Association reports that school is the top source of stress among teens followed by getting into a good college.

Source: apa.org



Students collaborate during the International Student Science Fair.

IMSA Leading in Global Collaboration

IMSA students, faculty, staff and administrators continue to reach out to the global STEM community recognizing that the challenges faced by this planet are interconnected and require communication and collaboration across cultural boundaries.

IMSA hosted students and teachers from Taiwan on campus in partnership with NIU in early September. Guests participated in Dr. Crystal Randall's class activities including DNA gel electrophoresis and other lab procedures, learned how to make copper rings and enjoyed Chicago fare during the week-long visit coordinated by science faculty member Sarah O'Leary-Driscoll.

IMSA was also proud to be a stop on a tour of government officials from Beijing, China in the fields of technology, education and urban planning. Aurora Mayor Richard Irvin hosted the delegation on October 24.

Dr. José Torres, IMSA President, Eric Smith, history and social science faculty, and rising seniors Jacob Sutter, Louise Lima and Shubha Verma are attending the Japanese Student Science Fair at the Ritsumeikan High School, Kyoto Japan November 14-18.

Mary Collins, Director of Special Projects, and Dr. Norman "Storm" Robinson III, Executive Director, Professional Field Services, are traveling to China and Malaysia with the Department of Commerce and Economic Opportunity Office of Trade & Investment as part of the FY18 Illinois Higher Education Mission. They are set to visit eight colleges and universities meeting with schools and government officials to introduce them to IMSA.



FUNShops

To register, please visit imsa.edu/funshops.

OUTREACH

Dec.

8

Makey Takey Holiday FUNshop

Saturday, Dec. 8, 2018 | 9:30 am – 12:00 pm
IMSA, 1500 Sullivan Rd., Aurora, IL

Registration Closes: Dec. 1

Join us as we explore the world of circuits and make things that can be taken home and gifted!

Grades 3-4

You don't need wires to run circuits when you can use pens and tape! Our engineers get to MAKE fun items and TAKE them home. Participants will get to create their own buzzing card for someone special and light up a picture frame to dazzle a photo!

Grades 5-6

What is light? Can we add lights to the things we wear?! Our product engineers will use conductive thread to create two wearable circuit projects (one to WEAR and one to SHARE). It's gonna be LIT!

Jan.

25

Invention Convention FUNshop

Friday, Jan. 25, 2019 | 6:00 pm – 8:30 pm
IMSA, 1500 Sullivan Rd., Aurora, IL

Registration Closes: Jan. 18

Scholarship Application Closes: Dec. 15

This Funshop has very limited seats available, so make sure to register early!

Grades 3-4

Prepare to be dazzled by the ingenuity and creativity coming out of our Invention Convention Funshop! We will be welcoming the new year by challenging our young artists & engineers to create awesome ArtBots that might give Picasso a run for his money. Students will learn the science behind circuits and how to wire one, and with that knowledge they will create two different ArtBots, including one to take home.

Grades 5-6

Ladies and gentlemen, start your engines for the Invention Convention FunShop where young innovators will be tasked with the challenge of creating self-powered cars for the racetrack. Engineers will get the chance to design 2 different car models – one powered by an electrical circuit with the help of a littleBits© kit and another that runs on the elastic energy of rubber bands – and then it will be off to the races with their one-of-a-kind inventions!



Welcome to IN2, Dr. Page



Dr. Kelly Page has been selected as the Chief Innovation Officer managing IN2, Steve and Jamie Chen Center for Innovation & Inquiry, and other collaborative initiatives across the Academy.

Dr. Page has been an active member of the IMSA community, serving as a Research Fellow in Social Leadership curating experiences in social leadership, social mediated literacies, and the social design principles of IMSA in addition to leading successful website and social media engagement efforts for the 2018 International Student Science Fair held on IMSA's campus June 27-July 1.

"Dr. Page is a strong leader, collaborator and champion for innovation and research," said Dr. José Torres, IMSA President. She will be instrumental in nurturing faculty, staff, and students to take advantage of the opportunities of the future by spurring design thinking and social leadership and expanding outreach and innovation of our Academy regionally, throughout the state of Illinois and the world," said Dr. Torres.

Dr. Page has over 18 years of experience working in social design and social learning of social media for startup to Fortune 500 companies, creating truly social cultures, brands and leaders. Her work has been published in leading peer-reviewed business, education and technology journals and featured in The New York Times, Fast Company, and Wall Street Journal. She has received awards from IDMA and a

BIMA – Best in British Digital. Dr. Page is regularly invited to speak on topics such as social leadership, the art of social media and women in business, technology and leadership. She has spoken at TEDx, Ignite and Pecha Kucha and opened TEDx Cardiff with her talk "Rediscovering Friendship."



The National Merit® Scholarship Program recently named 34 semifinalists from the Illinois Mathematics and Science Academy® (IMSA) in its 2019 competition. IMSA semifinalists represent 24 different communities throughout Illinois. IMSA's Semifinalists in the 2019 National Merit® Scholarship Program are:

- Zachary Andersen, Gurnee
- Surya Cannon, Lisle
- Bert Cao, Libertyville
- Allen Chen, Naperville
- Daniel Chen, Dunlap
- Joshua Eberhardt, Schaumburg
- Matthew Feinberg, Arlington Heights
- Audrey Gallier, Brookfield
- Kaushal Gumpula, Aurora
- Hanson Hao, Bloomington
- Nathaniel Kim, Prospect Heights
- Liana Koleva, Arlington Heights
- Leon Li, Peoria
- Andy Liu, Libertyville
- Eva Liu, Naperville
- Katie Lu, Libertyville
- Kevin Mikos, Elmhurst
- Harshavardhan Nalam, Dunlap
- Rebecca Osar, Belvidere
- Prachi Patil, Moline
- Devika Prasad, Naperville
- Chetan Reddy, Peoria
- Faris Shaikh, Springfield
- Bharath Sreenivas, Aurora
- Srivinay Tummarakota, Peoria
- Anthony Un, DeKalb
- Tommy Vadahumchery, Mount Prospect
- Abigail Vanderploeg, Aurora
- Tanmayee Vegesna, Buffalo Grove
- Shubha Verma, Forsyth
- Kristin Wolford, Batavia
- John Woods, Plainfield
- Annie Xu, Lincolnshire

Intersession 2019

Interession is a week-long learning opportunity offered between first and second semester. Over 55 sessions are offered by faculty, staff, students, alumni, and outside guests. Interession allows students to explore areas of interest outside the curriculum through a variety of offerings including special math and science topics, cultural studies, and on- and off-campus educational trips. For a full list of course opportunities, visit imsa.edu/interession.

From January 7 - 11, 2019, IMSA students will have the opportunity to participate in International travel on some of these amazing education excursions. Here are some of the exciting topics and places our students will be traveling this year:

Art and Architecture in Italy

Students will be visiting Rome, Vatican City, and Florence, Italy, to have a first-hand experience with the art and architecture of these three cities. They will visit multiple art museums, churches, and historical sites each day and have the opportunity to hear the Pope speak in person at the Vatican.

Modern Physics in Europe - Einstein to CERN

The objective of this session is to gain both a historical and current perspective on some of the most important ideas in modern physics and to engage in the European geography and institutions that are relevant to these ideas.

They will follow the geographic path Einstein took during the first 26 years of his life, just past the seminal year of 1905, and to explore some of the influences behind his theories, especially his special theory of relativity. They will also spend time at The European Organization for Nuclear Research, known as CERN, whose purpose is to operate the world's largest particle physics laboratory.

Cultural Explorations & Language in Spain

This is an opportunity for students to explore the beautiful capital of Spain while learning about the culture, cuisine, and history of Madrid.

The Many Facets of Japan

Students will get a chance to experience Japan and all it has to offer beyond what is portrayed in pop culture media. They will develop a deeper understanding of the meaning of culture as well as how various influences, internal and external, make-up how they identify and how that identification is interpreted. They will explore the many facets of the culture and history through our thematic day-to-day itinerary. The primary location for the duration of our stay will be in the Tokyo area.

Mexico City: Language and Culture Immersion

Students will get a chance to practice and improve their Spanish by interacting with the locals, attending a theater performance, visiting world-renowned museums, and exploring neighborhoods. They will have an opportunity to climb up ancient pyramids, hang out at a castle, discover the many attractions of the oldest urban park in America (no, not the country), ride a bike or take a stroll on an iconic avenue, and experience first-hand what they have learned about in their classes.

SCIENCE WING



*Bruce and Barbara Tietz
visit new science wing.*

Michael J. Birck Science Wing Opens

IMSA is proud to have opened the Michael J. Birck Science Wing this fall thanks to a generous lead gift by The Tellabs Foundation, a major gift from Bruce and Barbara Tietz in honor of Jennifer Tietz '97, and philanthropic support from many friends of IMSA.

Among these supporters is IMSA student Amit Somalwar '19, who donated proceeds from his Better Minds Prep tutoring business this summer to support equipment for the new science wing, formerly known as the B Wing Science Labs.

The space was completely renovated with new labs, associated classrooms and offices. The new science wing capabilities include:

- The ability to do tissue culture and virus work
- The ability to do advanced optics work
- The ability to work with (low level) radioactivity
- Geiger counters, alpha, beta and gamma sources
- The ability to do computational physics
- The ability to synthesize and detect organics

Seasoned Faculty to Lead SIR Program

IMSA is proud to announce that Dr. Don Dosch, Dr. Dave DeVol, and Dr. Eric Smith have been appointed to lead the Student Inquiry and Research (SIR) program at IMSA.

Dosch, a member of the Biology faculty for 26 years, also serves as the science team curriculum and assessment leader. DeVol, a member of the Chemistry faculty for 13 years, is also the operational coordinator. Smith, History/Social Science faculty, has also held adjunct positions at Loyola University, Columbia College Chicago, and Aurora University. He has taught at IMSA since 2007. Joining them as Grainger Lab supervisor is David Hernandez, formerly with Professional Field Services, and Cathleen Cunz, administrative assistant. Professionals at local universities and national laboratories in the Chicagoland area as well as IMSA faculty and staff serve as SIR mentors.

The team is developing new guidelines and requirements for the SIR Program that is responsive to the interests of students and rigorous inquiry that runs the range from publication quality research to personal interest. This work involves the development of discipline-specific outcomes while maintaining uniformity in expectations and rigor. The minimum commitment for students will be one academic year, but a two-year commitment is encouraged as a way to deepen involvement and learning.

The SIR Program will also be seeking to fill two research faculty positions to maintain active research programs that engage and involve students. The work of the research faculty will be to pursue original research that potentially leads to publication or conference presentation.



International Student Science Fair 2018

The Illinois Mathematics and Science Academy® (IMSA) was honored to host the 14th Annual International Student Science Fair for the first time on American soil June 27 - July 1, 2018. The five-day event highlighted three global challenges that transcend national boundaries: water, hunger, and energy. Through the theme, "Significantly influencing life on our planet through cooperation and collaboration," IMSA strove to deepen its mission as the world's leading teaching and learning laboratory for the prosperity and security of present and future generations.



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