

IMSA360

SUMMER2010

News for Alumni and Friends of the
Illinois Mathematics and Science Academy®

Imagination and Inquiry Unbound:
Serving Educators and Students
in Illinois and Beyond





FROM THE PRESIDENT

Dr. Glenn W. "Max" McGee
IMSA President

IMSA's 22nd class graduated in June 2010. Members of this class will always be special to me because we began our IMSA journey together in 2007 with a mixture of exhilaration and trepidation, pride and panic, hope and humility. We knew that we were privileged to join this innovative community, a distinguished international leader and exemplar in mathematics and science education. From day one, we understood that the words of the mission statement about "advancing the human condition" were meant for us, and we all had the formidable responsibility to make a tangible difference to our colleagues, friends and to others across our campus, community, state and nation.

I am proud to say that members of the Class of 2010 have developed and used their talents and skills to reach extraordinary heights of achievement. While their contributions are many, I will name a few. They helped to place IMSA among the top eight educational institutions in the world in the 12th annual international High School Mathematical Contest in Modeling (HiMCM) and won first place in the 30th annual Illinois Council of Teachers of Mathematics State Math Contest. They achieved honors in the Intel Science Talent Search and Siemens Competition in Math, Science and Technology. They presented their investigations at national and international forums. Members of this class contributed more than 31,000 hours to Illinois citizens by tutoring, mentoring, teaching and volunteering in medical centers, senior citizen and youth centers, food pantries, schools, libraries and museums. They developed "Shine On," a series of events to create awareness about those affected by leukemia and lymphoma and raised nearly \$9,000 for the Leukemia and Lymphoma Society. As a graduation speaker, IMSA Senior Michael Mirski urged his classmates to keep developing and sharing their talents. "...Continue satisfying your intellectual curiosity," Mirski said. "Keep igniting your creative minds. Advance the human condition."

As I think of my three years at IMSA, I am immensely proud of the work we have done to serve educators and students throughout the state of Illinois. This issue of *IMSA360* presents vivid highlights of how our statewide mathematics and science programs enhance teacher skills in inquiry-based instruction and nurture student interest in mathematics and science. Through the commitment of our highly talented IMSA faculty and staff and through the tremendous support of the IMSA Board of Trustees, IMSA Fund for Advancement of Education Board of Directors, government leaders, educational partners and donors, we have been able to expand our programs for Illinois teachers and students. We opened Field Offices in Chicago and Metro East and will open another in Rock Island. We've hosted summer and school-year programs for educators and students in rural, urban and suburban communities throughout the state. We are designing virtual collaborative networks so we can share resources and work together on innovative projects.

We've made great progress by serving thousands of educators and students, but we have much more to do. We cannot rest until we make academic success and high-tech careers a reality for talented Illinois students from all geographic locations and from all economic backgrounds.

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Send comments, questions or story ideas to:

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NEWSHEADLINES

News for alumni and friends of the
Illinois Mathematics and Science Academy® (IMSA)

Illinois Tool Works Supports IMSA Programs for Illinois Teachers and Students

The IMSA Fund for Advancement of Education (www.imsa.edu/giving) received a \$25,000 grant from Illinois Tool Works, Inc. (ITW). The funding will be used to support IMSA's after-school and summer enrichment programs for Illinois children and IMSA professional development programs for Illinois educators.

ITW is a multi-national manufacturer of a diversified range of value-adding and short lead time industrial products and equipment. The company consists of approximately 800 business units in 57 countries and employs approximately 59,000 people.

ComEd and the Adler Planetarium Name Student and Resident Counselor Contest Winners

As winners of the ComEd and Adler Planetarium *Shoot for the Moon* essay contest, IMSA student Egle Malinauskaite and IMSA Resident Counselor Sandra Mazuera both received the grand prize: separate all-expenses-paid trips to the U.S. Space and Rocket Center.



IMSA student Egle Malinauskaite



IMSA Resident Counselor Sandra Mazuera

IMSA Hosts National Expert in STEM Talent Development

Dr. Freeman Hrabowski, president of the University of Maryland at Baltimore County (UMBC), was the keynote speaker for IMSA's recent Community Day, which focused on professional development for faculty and staff. The day's theme was "Increasing the Number of STEM Leaders Through the Retention of Gifted and Talented Students Who May Be At-Risk: What Are We Doing and Why Is It Everyone's Job?"



Dr. Freeman Hrabowski

In 2008, *U.S. News & World Report* named Dr. Hrabowski (pictured above) one of America's Best Leaders and, in 2009, *Time* magazine named him one of America's 10 Best College Presidents.

In 1988, philanthropist Robert Meyerhoff and Dr. Hrabowski co-founded the Meyerhoff Scholars Program for high-achieving students committed to pursuing advanced degrees and research careers in science and engineering. The program has become a national model because of its high success rate in inspiring and preparing African Americans to pursue Ph.D.s in science and engineering.

Following Dr. Hrabowski's powerful presentation, IMSA employees participated in small group activities to discuss critical components of the Meyerhoff Scholars Program and how they might apply to IMSA's initiatives to recruit and retain talented students.

As a resource for the people of Illinois, IMSA embraces its charge to develop STEM leaders who reflect the rich demographic diversity of our state and nation.

Athlete Becomes IMSA's First Female IHSA State Champion



Junior Amber Farrell made IMSA history as the first IMSA female athlete to become an Illinois High School Association State Champion after winning first place in both the 100-Meter High Hurdles and 300-Meter Low Hurdles at the Class AA Girls' State Track and Field Meet.



Amy Allen received the Knight Family IMSA Scholarship. She is pictured (l-r) with Nancy Knight, IMSA Fund Board of Directors President Herbert Knight, Alicia Sams and Thomas Knight.

Amy Allen received the John H. McEachern, Jr. Exemplary Service Award. She is pictured with IMSA President Dr. Glenn W. "Max" McGee, Marie McEachern and IMSA Board of Trustees Member John McEachern, Jr.



Presenting Anusha Kumar with the award is IMSA President Dr. Glenn W. "Max" McGee (left) and George Van Verst.

Seniors Honored With Scholarships and Service Award

Two seniors were honored with scholarships and a service award administered through the IMSA Fund for Advancement of Education. Anusha Kumar received the Mary Van Verst Love of Science Scholarship, and Amy Allen received the Knight Family IMSA Scholarship and the John H. McEachern, Jr. Exemplary Service Award.

Student Named to 2010 Chicago Tribune All-State Academic Team



IMSA senior Sabrina Gonzalez Pasterski is one of only 10 students statewide named to the 2010 *Chicago Tribune* All-State Academic Team. Team members were chosen from 265 high school students throughout Illinois who were nominated by their principals.

Student Achievements Recognized in National and Global Venues

Ruchi Aggarwal, Daniel Pak and Mehal Shah qualified as finalists for the Intel International Science and Engineering Fair (Intel ISEF). Aggarwal and Shah each received \$1,000 for their third-place team award for their investigation. Known as the largest science competition of its kind, Intel ISEF hosts more than 1,600 students from nearly 60 countries.

Vashti Aguilar, Michael Gleeson and Yiru Tao presented their investigations at the International Water Forum in Kyoto, Japan.

Natasha DuMont Arvantis, Irene Chen, Vladislav Kontsevoi and Novi Singh qualified for the All-Star Competition of the American Computer Science League held in Robesonia, Pennsylvania.

Grace Chan, David Derry and Anderson West presented their investigations at the Seventh Annual Ritsumeikin (RITS) Super Science Fair in Kyoto, Japan.

David Derry, Shravanthy Gumidyala, Anusha Kumar, Iris Liu, Jonathan Loucks, Peter Nebres, Jonathan Park and Weili Zheng presented their investigations at the American Junior Academy of Sciences conference at the American Association for the Advancement of Science annual conference in San Diego, California.

Amber Farrell is co-author of an abstract presented at the National Academy of Engineering Grand Challenges Summit in Chicago, Illinois.

William Getz received the Ministry of Education Huayu Enrichment Scholarship to study Mandarin in Taiwan as a result of his outstanding achievements at the 2nd Annual Midwest Chinese Speech Contest held in Chicago.

Vladislav Kontsevoi presented his investigation at the American Physical Society annual conference in Portland, Oregon.

Anusha Kumar presented her investigation at the Society for Integrative and Comparative Biology national conference in Seattle, Washington.

Jade Martin, Cai O'Connell and Isolina Rossi were awarded National Security Language Initiative (NSLI) for Youth Scholarships to study Russian in Kazan, Russia during summer 2010. NSLI for Youth is sponsored by the U.S. government and is administered by the Bureau of Educational and Cultural Affairs of the U.S. Department of State. The recipients live with host families.

Liana Nicklaus is a co-author of "The Sloan Nearby Cluster Weak Lensing Survey" published in *The Astrophysical Journal Letters, Volume 702, Issue 2*.

Sidanth Sapru is the co-author of an abstract that was presented at the Experimental Biology Meeting of the American Society of Biochemistry and Molecular Biology in New Orleans, Louisiana.

IMSA Students Win First Place at State Math Contest

A team of 30 IMSA students won first place in the 30th Annual Illinois Council of Teachers of Mathematics (ICTM) State Math Contest (Div. 4 AA) held at the University of Illinois at Urbana-Champaign in May 2010. IMSA team members include: Irene Chen, Megan Chen, Raymond Chong, Victor Duan, Nicholas Fung, Andrew Go, Webster Guan, Derek Hardin, Eric Huang, Jayanshu Jain, Adam Kalinich, Alina Kononov, Vladislav Kontsevoi, Vignesh Kumar, Lucy Li, Corrine Madsen, Madhav Mohandas, Peter Nebres, James Pan, Sabrina Gonzalez Pasterski, Irina Pushel, Rose Sloan, Phil (Sung Hwan) Suh, Sonam Vyas, Harley Wang, Kelly Yom, Paul Yuan, Stanley Yuan, Vivian Zhang and Kevin Zhao. Their coaches were IMSA mathematics faculty members Dr. Steve Condie, Dr. Micah Fogel, Mark Kammrath, Dr. Michael Keyton and Dr. Noah Prince.



IMSA Faculty and Staff Achieve Recognition and Contribute to Their Fields

President Dr. Glenn W. "Max" McGee was the keynote speaker for the Midwest Tech Forum. Also presenting at the event were Director of Innovation and Entrepreneurship James Gerry, Senior eLearning Architect Dr. Carl Heine, and Science Faculty Members Diane Hinterlong and Dr. Aracelys Rios.

Science Faculty Member Dr. Mark Carlson is one of only six teachers statewide to receive the Illinois Science Teachers Association/ExxonMobil Outstanding Teacher of Science Award. The award recognizes extraordinary accomplishment in the field of science teaching.

President Dr. Glenn W. "Max" McGee, and Coordinator of Student Inquiry and Research Dr. Judith Scheppeler, were invited to deliver presentations at the Intel Educator Academy held in conjunction with the Intel International Science and Engineering Fair (Intel ISEF). The Intel ISEF Educator Academy brings together a "select group of educators and government officials from around the world to explore proven, innovative methods of engaging students in the study of science and math."

Principal and Vice President for Academic Programs Dr. Eric McLaren, participated in the panel presentation "Astonishing STEM Schools" at Intel's Visionary Conference 2010, held in Washington, D.C. Dr. McLaren was invited to showcase IMSA's programs that led to the Academy being named the nationwide winner of the 2009 Intel Schools of Distinction Star Innovator Award.

History/Social Studies Faculty Member Dr. Lee Eysturid delivered presentations at the Wisconsin Council for Social Studies Great Lakes Regional Conference and at the 40th Annual Consortium on Revolutionary Europe.

Dr. Stephanie Pace Marshall, IMSA founding president and president emerita, had her article, "Re-imagining Specialized STEM Academies: Igniting and Nurturing 'Decidedly Different Minds,' By Design" published in the January 7, 2010 edition of the *Roeper Review*, a journal on gifted education.

AWARDWINNERS

IMSA Announces 2010 Alumni Award Winners

Five extraordinary IMSA alumni are the recipients of the Fourth Annual IMSA Board of Trustees Alumni Awards.

The honorees will be recognized at the Alumni Awards Ceremony and Alumni Volunteer Recognition Dinner on Friday, July 23, 2010. To see complete profiles of the 2010 IMSA Board of Trustees Alumni Award winners visit https://www3.imsa.edu/alumni/awards/recipients_current.

These awards are the highest honors given to alumni in recognition of their accomplishments and contributions to their professions, to IMSA and to the citizens of Illinois, our nation and the world. Two categories of awards will be given: the Alumni Distinguished Leadership Award and the Alumni Titan Award.

The Academy and the Board of Trustees wish to thank everyone who nominated an alumnus for the awards program. To nominate an alumnus for the 2011 Alumni Awards Program or for more information, please visit <https://www3.imsa.edu/alumni/awards/nominations>.

The Alumni Distinguished Leadership Award

The Alumni Distinguished Leadership Award is an annual award that honors alumni who have made distinguished achievements or leadership contributions in their professional fields of endeavor consistent with IMSA's mission. The awardees also may be recognized for significant civic or community contributions or for extraordinary courage and selflessness under challenging circumstances.



Dan Frakes '89 is a respected technology writer and editor, focusing on personal computing and digital media. He has written more than 800 articles and has authored or contributed to more than 20 books, including one of the early e-books nearly 15 years ago. He is currently a senior editor and columnist at

Macworld magazine and website, and an editor for the *Take Control* series of electronic books. In 2006, Frakes was named to the MacTech 25, a publicly chosen list of the most influential people in the Mac technical community. Frakes is a graduate of the University of California, Los Angeles.



Lillian Kao, M.D. '89 is an associate professor in the Department of Surgery and Faculty for the Center for Clinical Research and Evidence-Based Medicine at the University of Texas Health Science Center in Houston (UTHSC). She also serves as the Vice-Chief of Surgery at the Lyndon B. Johnson

General Hospital in Houston. Dr. Kao's main research interest is the prevention and treatment of surgical infections. In particular, she is interested in maximizing compliance with evidence-based guidelines for the prevention of these infections within a county hospital system with limited resources. Dr. Kao received her medical degree from the University of Michigan in Ann Arbor.



Travis Schedler, Ph.D. '98 is an instructor in mathematics at the Massachusetts Institute of Technology, where he holds a five-year fellowship from the American Institute of Mathematics (AIM). Dr. Schedler was the sole recipient of the 2008 AIM Fellowship, an award that is "intended for an

absolutely first-rate new Ph.D. – someone with the potential to leave a lasting mark on mathematics." Schedler has written or co-authored 19 research articles and is fluent in French, an accomplished keyboard musician (piano and organ) and a triathlete. Schedler is a graduate of Harvard University and the University of Chicago.

AWARDWINNERS

The Alumni Titan Award

The Alumni Titan Award is an annual award that honors alumni who, through outstanding service to IMSA, advance the institution's mission and work. The honorees are enthusiastic and energetic IMSA champions who dedicate significant time, talent and/or treasure to endeavors that help the Academy fulfill its role in developing talent and leadership in mathematics, science and technology for our state, nation and world.



Mike McCool '91 has generously given his time, talent and treasure in ways that have had tremendous strategic impact on IMSA. McCool has already made two major financial contributions to IMSA in 2003 and 2007. In addition, McCool has been a significant thinking partner for IMSA leaders and most

recently, he accepted Governor Quinn's invitation to attend the State of the State address in January 2010, as a representative of Illinois' (and IMSA-UIUC) Internet pioneers/entrepreneurs. McCool is a graduate of the University of Illinois at Urbana-Champaign and served on the team at UIUC that created Mosaic, the Internet browser used to start Netscape. McCool currently is a

user interface and graphics programmer at Aechelon Technology, which develops high-end military flight simulator graphics for search and rescue and transport helicopters primarily for the Marines, Navy and Coast Guard.



Ray Stadt '93 contributes his expertise as a practicing science teacher to help IMSA develop talent and leadership in STEM. Stadt has been an invaluable contributor to IMSA's Problem-Based Learning (PBL) summer programs for teachers. In these programs, he mentors educators

both at IMSA and at Benedictine University (BU) where he works with the interns in its Alternative Certification Program (ACP). He also co-facilitated two Motorola PBL Design Institutes and delivered PBL Design Institutes in Indianapolis and at Aurora University. Stadt currently teaches chemistry, forensic science and integrated science at Eisenhower High School in Blue Island, Illinois. He is a graduate of Valparaiso University and Trinity Christian College.

ALUMNI-IN-ACTION



Future Weather Gets Tribeca Boost

Future Weather, a film written and directed by **Jenny Deller '94**, was one of only six films to be awarded \$140,000 from

the Tribeca Film Institute (TFI) Sloan Filmmaker Fund, provided by the Alfred P. Sloan Foundation. The TFI Sloan Filmmaker Fund awards grants to narrative film projects that dramatize science and technology themes in film, or that portray scientists, engineers or mathematicians in prominent character roles. To learn more about Jenny's film, visit <http://www.futureweathermovie.com>.



Teaching for America

Elisabeth Allen '06 graduated Magna Cum Laude with High Honors from the University of Georgia and was awarded a 2010–2011 Fulbright Scholarship to Indonesia. In addition, she was selected from more than

35,000 applicants nationwide to join Teach for America, a national teacher corps of recent college graduates who commit two years to teach in under-resourced public schools. While teaching in Baton Rouge, Louisiana, Elisabeth plans to seek a Master's Degree from Louisiana State University.



Influential Woman in Technology

IMSA alumna **Clara Shih '00** has been named one of the Most Influential Women in Technology 2010 (The

Entrepreneurs group) by *Fast Company* magazine. Shih authored *The Facebook Era*, which is now used as a textbook at the Harvard Business School. She is now the founder of Hearsay Labs, a social media marketing Software Company based in San Francisco. To view Clara's profile in *Fast Company*, visit <http://www.fastcompany.com/article/clara-shih-hearsay-labs>.

Hamster Ball Enthusiast

How do many alumni know that the IAA has a website? Outside of storing IAA Cabinet documents or occasional event registrations, the current (and decidedly unexciting) site does not offer much to the wider alumni community.

I am excited to announce that the IAA will launch a new website and enhanced alumni directory this summer. The new online presence for alumni will allow us to create a more unified communication strategy between IMSA and the IAA, and we hope it becomes a place you will visit often to learn about each other, current students and IMSA. As the site takes shape, we will send you email updates.

I would especially like to thank alumni Maciej Babinski '97, Melvin Bacani '90, Kevin Colby '95, Ande Croll '97, Greg Dhuse '99 and IMSA staff members Carolyn Johnson and Jennifer Spuehler for their contributions toward creating a vibrant web presence more suitable for our (decidedly exciting) alumni.

In keeping with my last letter and the theme of this issue of *IMSA360*, I also would like to thank the numerous alumni who have contributed significant time and energy to IMSA's programs that serve students and teachers throughout Illinois and elsewhere. Alumni play key roles in many of IMSA's most successful programs, often contributing powerful, unique perspectives as their dual roles of consultants and former students.

For example, Ray Stadt '93 has been essential to spreading Problem-Based Learning, and Cindy Lyles '02 has an opportunity to interact with downstate students and teachers in entirely novel ways through her work in the Academy's Belleville Field Office. We should also remember that some of IMSA's external programs were initiated by alumni during their time at the Academy. Kevin Bock '04, Sylvie Chau '00, Roy Droste '01, Carrie Eklund (Giordano) '99, Ariel Hooker '01, Elizabeth Lawrence '01, Linda Lee '01, Donielle Newell '00, Linda Pinto '03, Jorge Reyes '99, Jennifer Vanichsombat '00 and other early volunteers for the IMSA Kids Institute® probably had no idea at the time that it would grow to serve more than 32,000 students and educators throughout the state.

These few examples of alumni contributions should remind us of how important it is to stay involved with the Academy and current students, as well as the need for alumni to suggest new ideas.

—Matthew Knisley '01
IMSA Alumni Association President
president@imsaalumni.org

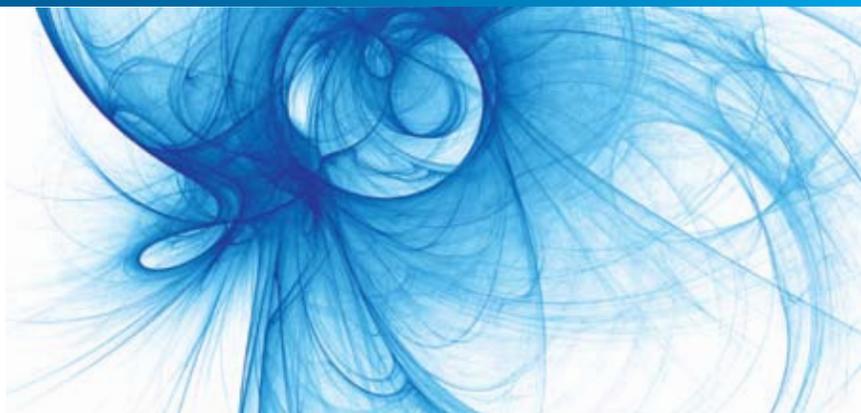


"I learned how to do comprehensive planning and to think about my students as I plan the problem."

— Samantha Hunt, Reading and Social Studies Teacher, Unity Point Elementary School, Carbondale, IL
Participant in Problem-Based Learning programs, Mentor Teacher for Summer Sleuths



The Illinois Mathematics and Science Academy's (IMSA) Professional Field Services offers research-based, practice-proven educator and student programs to transform mathematics and science education across Illinois and beyond.



PROFESSIONAL FIELD SERVICES

Igniting and Nurturing Educators
and Students in Illinois and Beyond

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Professional Field Services (PFS) offers innovative educational products and services for educators, schools and districts. The focus is on professional development in science, technology, engineering and mathematics (STEM) curriculum and instruction. IMSA also delivers enrichment programs to stimulate the interest, motivation and achievement of elementary, middle and high school students in STEM areas. Offerings are held on IMSA's Aurora campus, at locations throughout Illinois and online.

IMSA's Professional Field Services reaches teachers and students throughout the state of Illinois through Statewide Educator Initiatives, Statewide Student Initiatives, the Problem-Based Learning Network and IMSA Excellence 2000+ (IMSA E2K+).

"I had the opportunity to collaborate with educators from across the United States, China and Korea, and I have been able to meet and learn from real-life scientists, even scientists from NASA. Problem-Based Learning has truly helped me be a lifelong learner."

– Marge Olszewski, 4th–5th Grade Teacher, Mable Woolsey School, Knoxville, IL
Participant and Coach for Problem-Based Learning programs



IMSA After-School Enrichment Program: A Proven “Best Practice” in STEM Education



For nearly 10 years, from Carbondale to Chicago, the IMSA Excellence 2000+ (E2K+) program has reached more than 8,400 students with inquiry-based, problem-centered, competency-driven and integrative hands-on learning experiences.

IMSA Excellence 2000+ (E2K+) is an after-school program that engages Illinois teachers with IMSA staff to enhance STEM (Science, Technology, Engineering and Math) instruction. Teachers use IMSA-developed curriculum at their schools with 4th–8th grade students who are talented, interested and motivated in mathematics and science.

IMSA Excellence 2000+ began in 2000 with seven pilot sites as an after-school enrichment program in mathematics and science for students in grades 6–8. Since then, the program has grown to include more than 60 schools from throughout the state, currently impacting more than 1,700 students and nearly 200 teachers. In addition, IMSA E2K+ has expanded to now include students in grades 4–5.

“Teachers from participating schools are supported with curriculum kits and lab materials in conjunction with ongoing professional development for the delivery of the curriculum units,” said IMSA E2K+ Project Director Jami Breslin. “Professional development includes pedagogy, orientation and planning workshops, content-specific unit workshops and networking webinars for schools,” she added.

And the preparation is paying off. Based on teacher surveys, part of the evaluation process, E2K+ teachers have reported the following changes in classroom practice:

- 94% reported an increase in the application of mathematics and science
- 100% reported an increase in use of open-ended, student-driven, high-level questioning
- 94% reported an increase in integrative learning experiences across disciplines
- 100% reported an increase in the use of real-world problems in the classroom

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IMSA Excellence 2000+ Site Support Specialist Sharon Poynter Former Teacher Now Champions Others

Sharon Poynter was a teacher in one of the seven pilot IMSA Excellence 2000+ (E2K+) schools and says she saw firsthand the power of the E2K+ Program with student learning.

“I saw students have ‘a-ha!’ moments over and over again with this program,” said Poynter. “No one is telling or lecturing to the students; they are allowing the boys and girls to experiment, collect data, organize data and draw conclusions.”

Poynter said IMSA’s E2K+ program is designed for talented and motivated students.

“It is keeping our young people interested in science and math with real-world problems,” she added. “This inquiry method results in deeper understanding of concepts that we want students to understand.”

In addition, Poynter said the teacher professional development portion of the E2K+ program is just as important as the student learning that takes place.

“They become better teachers, taking much of this ‘discovery’ or inquiry method back to their classrooms. What they learned after school influenced their daily instruction.”

Now as an IMSA Excellence 2000+ Site Support Specialist, Poynter sees the teacher and student excitement in action.

“This year as I visited schools, I found students building toothpick bridges and testing them for strength, making mini-landfills to investigate decomposition rates, researching invasive species, and recently I visited a school where they were extracting DNA from strawberries,” Poynter said.

Poynter says the future for the IMSA Excellence 2000+ program is bright.

“...It will exponentially affect so many more students. This program is truly improving math and science education in the state of Illinois.”



In addition to the impact on teachers, the impact on students is also evidenced through the IMSA E2K+ High School Transcript Study. This study focuses on both the motivation and success of former E2K+ students in high school. The study shows most former E2K+ students (60% in mathematics; 83% in science) are enrolling in at least one advanced course their freshman and sophomore years with strong performance (85% average grade in mathematics; 89% in science).

A total of 147 former E2K+ students have attended or are currently attending IMSA's advanced, residential college preparatory program.

"E2K+ became a place where their talents were recognized and where their interests in math and science could be deeply explored," Breslin said.

In 2006, IMSA E2K+ was selected as one of the "Best Practice" STEM Education programs showcased in our nation's capital at a STEM Education Diversity Forum hosted by the Bayer Corporation. The forum highlighted programs with a "proven track of helping girls and underrepresented minorities to participate and achieve in STEM."

To learn more about IMSA Excellence 2000+ visit <https://www3.imsa.edu/programs/e2k>.



IMSA E2K+'s most recent endeavor is a student-created project exchange with Cameroon schools working with Ape Action Africa (<http://www.apeactionafrica.org>), a sanctuary for orphaned gorillas, chimpanzees, and other endangered primates. This global relationship will promote ongoing collaboration and study, with a focus on biodiversity, ecosystems and environmental awareness.

IMSA Problem-Based Learning Network: Impacting Educators Worldwide

IMSA's Problem-Based Learning Network (PBLN) serves educators nationwide and beyond.

"We have worked with more than 5,500 teachers in 34 states and seven countries, most recently doing a lot of work in Ohio through the Ohio STEM Learning Network," said Deb Gerdes, director for PBL Initiatives.

The Problem-Based Learning Network offers educators professional development in Problem-Based Learning (PBL) strategies and theory. PBL provides a framework for students to engage in critical thinking, problem solving and collaboration as they gain content knowledge by exploring real-world issues.

Educators can choose from summer institutes (introductory, advanced and facilitator levels), class visits, seminars and webinars to design a program that best meets the needs of faculty or team members at their particular school.

Gerdes says the value of IMSA's PBLN is that it empowers educators to take what they've learned and immediately apply it for their own classroom use.

"Literally hundreds of PBL units were developed over the past year alone, each designed by the teachers specifically for their learners, curriculum and context," Gerdes said. "These ranged from primary students investigating the concept of solar energy to middle school students investigating the feasibility of Personal Air Vehicles (flying cars) as a way to reduce traffic congestion to high school students developing a dialysis machine for pediatric patients."

In addition, teachers using PBL in the classroom report that it has a powerful impact on student learning.

"Teachers tell us that their students are more engaged and understand the content and concepts more deeply when it is presented through a PBL unit," she said. "The teachers also report a re-invigoration in themselves – they enjoy teaching again!"

IMSA's work received media coverage this past year in a series of articles in the *Akron Beacon Journal* focusing on the Akron Public Schools and its new National Inventors Hall of Fame STEM middle school. IMSA's Gerdes and PBL team worked with teachers from the Akron school in the development of problem-based units for the new school.

In addition, Gerdes is now serving on a Problem Solving workgroup for a national initiative called EdSteps sponsored by the Council of Chief State School Officers to support and promote effective teaching and assessment of key skills in learners of all ages (<http://www.edsteps.org>).

Gerdes says Problem-Based Learning continues to gain momentum and recognition nationwide as an integral skill for the 21st century workforce.

"Problem-Based Learning is becoming widely recognized as a pedagogy that will develop the critical thinking, problem solving and collaboration skills necessary for success in a global environment."

To learn more about IMSA's Problem-Based Learning Network (PBLN) visit <http://pbln.imsa.edu>.



Students in IMSA's Summer Sleuths program used Problem-Based Learning to investigate the "number exhaust" issue (running out of phone numbers). A numbering plan expert was so impressed with their work that two students and a teacher were invited on an all-expense paid trip to present their solutions to the Federal Communications Commission (FCC) and the North American Numbering Council in Washington, D.C.

Professional Development for Aspiring Teachers

“I DO, WE DO, YOU DO”



In recent years, IMSA has partnered with the Golden Apple Foundation and a number of Illinois universities to deliver professional development to college students who are preparing to become mathematics or science teachers. Known as preservice educators, these men and women spend portions of their summers participating in IMSA programs to learn to deliver inquiry-based instruction to young students enrolled in summer programs.

In this interview with IMSA Program Director for Statewide Educator Initiatives Dr. Susan Bisinger, we learn how preservice educators benefit from early exposure to curriculum and instructional practices.

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IMSA360: Why does IMSA Professional Field Services have different programs for preservice and current educators?

Bisinger: For preservice teachers, a large portion of what they are learning is still theoretical. They haven't had as much of a chance to apply teaching concepts, ideas and techniques in an actual classroom situation. Programs designed for these educators offer them the opportunity to try out the things that they have learned. Current teachers, on the other hand, *do* have experience in how students are likely to respond to various approaches and content. Experienced educators want and need programs that give them fresh ideas about the content they teach, new ways to approach different types of learners, and new techniques that may be novel or different from the way they've done things in the past. Sometimes current educators just need confirmation that what they're doing is a good and effective way to teach.

IMSA360: The Golden Apple Summer Institutes and Teacher Candidate Institutes are for preservice teachers. What do these programs emphasize?

Bisinger: Both Teacher Candidate Institutes* and the Golden Apple Summer Institutes* give these preservice educators the opportunity to learn IMSA's inquiry-based and problem-centered instructional approach. Information from a variety of disciplines may be integrated to enhance learning – for example, using

a piece of literature to introduce a mathematics or science concept. Preservice educators learn how the approach is used within a specific content or curricular area (i.e. a lesson), and they apply that approach with students while being observed and coached by experienced professionals. Recently, the National Staff Development Council spoke of the “I do, we do, you do” approach to professional growth – that's exactly what our preservice educator programs do. In our programs, we show the teachers what the approach looks like by explaining it and modeling it for them (I do), let them try out the approach with their peers and debrief with them regarding how the lesson went (we do), and finally, let them use the approach in a lesson with students (you do), again followed by a debriefing.

* See page 15 for a program description.

IMSA360: You talk about inquiry-based and problem-centered instruction. What does that look like?

Bisinger: I would say that the heart of inquiry-based instruction is questioning – not questions from the teacher to the student that have a right or wrong answer, but questions from the students to themselves – questions that are “wonderings.” This kind of questioning leads students to try to find answers, to manipulate variables and to observe what happens.

Problem-centered instruction focuses on the real world of the student. It provides a context in which students can investigate a phenomenon or a problem.

Summer Programs for Preservice Educators

Teacher Candidate Institutes are two-week programs for preservice teachers of mathematics or science. The Institutes are offered by IMSA in partnership with various colleges and universities throughout Illinois. Teacher candidates receive training in IMSA's unique approach to curriculum planning and inquiry-based instruction. The candidates are mentored as they apply what they have learned in a hands-on teaching experience with late elementary or middle school students.

The Golden Apple Summer Institute is a five-week residential experience offered at IMSA for preservice teachers who have been accepted as Golden Apple Scholars of Illinois (www.goldenapple.org). The IMSA/Golden Apple Summer Institute helps scholars learn and practice an inquiry-based, problem-centered instructional approach that engages students in hands-on, minds-on mathematics and science activities. A three-year sequence of Summer Institutes enables scholars to achieve increasing skill levels in curriculum planning and delivery as they teach middle and high school students.



“The experience I had was invaluable. I’d do it again in a heartbeat! It was great that we had instant feedback from master teachers, right then and there.”

– Stephanie Rynes, Senior at Southern Illinois University Edwardsville
Participant in Teacher Candidate Institute at SIU-E

When students are given the opportunity to ask their own questions, to try something out, to figure out how it works and why and what they can do about it, the learning goes much deeper. This is called a “constructivist” approach to teaching – in which the learners construct their own understanding of a concept rather than merely learning it by rote.

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IMSA360: Can you give some specific examples of projects that the preservice teachers will be doing with the students?

Bisinger: Preservice teachers who participate in the Teacher Candidate Institutes learn the content of one of our summer programs by doing all the activities as if they were students. For example, they learn to apply the fundamentals of Newton’s Laws of Motion by creating paper frogs that jump. They gather and analyze data about the relationship between the mass of the frogs and the distance travelled. In another example, they explore their questions about climate change by measuring and analyzing layers of a simulated “Ice Core.” They develop hypotheses about the weather during various “periods” based on the kind of fossils they find in the layers of core. Preservice teachers then use these activities with young students enrolled in IMSA’s summer programs while being coached by our talented and experienced staff.

“I hope to help my students become inquiry-based learners and problem solvers, NOT just memorizers.”

– Elisabeth Knierim, Sophomore at Southern Illinois University Edwardsville
Participant in Golden Apple Foundation Summer Institute 2008, 2009, 2010



One-Day Programs for Educators

Educator Energizers are no-cost, drop-in “teacher fairs” offered through IMSA’s Field Offices for all educators. Representatives from museums, colleges, universities, IMSA and other organizations showcase classroom activities. In short workshop sessions, teachers engage in lessons and ideas that are classroom-ready and can be used the next day. Also, exhibitors share information about a wide range of offerings for teachers and students in the local area.



In a recent Educator Energizer event held in Belleville, representatives from 4-H, IMSA, Lindenwood University, U.S. Army Corps of Engineers for the Melvin Price Locks and Dam, St. Louis Zoo and Southern Illinois University Edwardsville featured their programs for teachers and students. Demos gave teachers ideas of low-cost STEM activities that they easily could use with their students. For example, a fun exercise to demonstrate air pressure only required the use of a plastic garbage bag and a vacuum cleaner.

Educator Seminars are highly interactive half or full-day programs that are designed and delivered by IMSA faculty and staff. A wide variety of topics such as the history of science, alternative sources of energy or Euler’s contributions to mathematics are explored through multimedia approaches, dialogue and problem solving. Targeted for secondary and post-secondary teachers, Educator Seminars demonstrate ways to engage learners in considering complex questions and issues.

Professional Learning Days are scheduled primarily on County Institute Days. These mini-conferences feature sessions on

“The best way for me to learn is to have a role model to follow and then have the opportunity to practice and get feedback on what I am doing.”

– Dodi Alber, Teacher of Integrated Science, Highland High School, Highland, IL
Participant in Teacher Candidate Institute at Southern Illinois University Edwardsville

IMSA360: What are your expectations for the preservice programs?

Bisinger: We want preservice educators to consider and apply inquiry-based strategies during student teaching or classroom situations. We use Logic Models to help us design our programs and reach desired outcomes. That is, we document goals, rationales, assumptions, resources, activities, outputs and desired outcomes.

We ask participants to conduct formal reflections about their experiences. Reflection is one of the ways teachers grow in their profession. By sharing their reflections, they tell us what they want to learn, practice or work on. They also tell us whether we’ve been successful, or if we need to make program modifications or changes.

Our plans include following our participants through their student teaching or early teaching years by asking them, their supervising teachers or mentors, and possibly their principals, which constructivist approaches they have used in their classrooms. We also plan to offer an online opportunity for them to stay connected with each other through the coming years. ■■

“It was an amazing experience. One thing I can say that I took away is a feeling of confidence in teaching inquiry-based lessons as well as having student-led discussions.”

– Matt Carmody, Senior at Southern Illinois University Edwardsville
Student teaching at Lincoln Middle School in Edwardsville
Participant in Teacher Candidate Institute at SIU-E

mathematics, science, technology and pedagogy. Spotlighting the expertise of IMSA faculty and staff, these programs give teachers an opportunity to experience content and engaging methods they can readily apply to motivate and challenge their students. Professional Learning Days focus on STEM content that is critical to students’ lifelong learning and career success. More than 200 teachers participated in a recent Professional Learning Day held on IMSA’s Aurora campus.

Customized Workshops are designed for schools and districts that want to enhance inquiry-based teaching and learning in their mathematics and science programs.



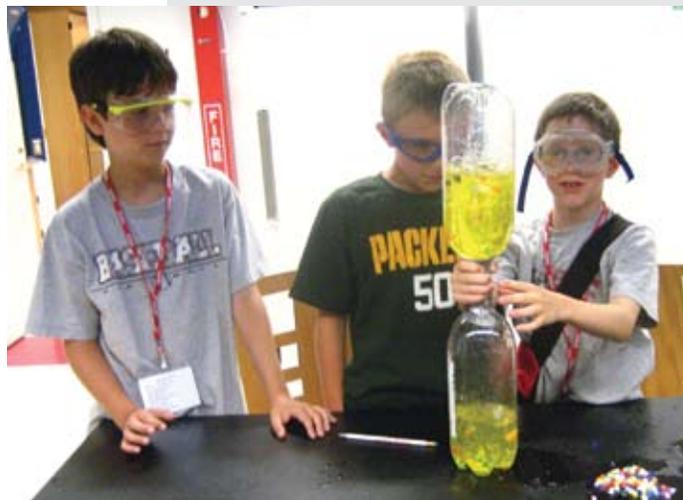
Statewide Student Initiatives Spark Love of Learning

It is no surprise that many of IMSA's summer programs for students in grades 3–10 are sold out months in advance.

For students who are passionate and curious about mathematics and science, programs like *Tracking Killer Storms*, *Kidsplorations in Technology*, *Energy@IMSA* and *Science Explorers* fuel their imaginations and satisfy their curiosities about the world around them – and how it works.

Since 1997, IMSA's statewide programs for youth have provided hands-on, integrative learning explorations in mathematics, science and technology for more than 30,000 students.

What began with just one program and 50 students has since grown to include 20 day programs and five residential programs in the summer of 2010 alone. In addition, programs are held during the school year throughout Illinois and new programs continue to be added.



Summer@IMSA programs this year included locations in Aurora, Carbondale, Chicago, Lake County, Rockford and Springfield.

To learn more about Summer@IMSA programs visit <https://www3.imsa.edu/programs/SummeratIMSA>.

Story continued on page 18.

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Statewide Student Initiatives Advocate and Parent Patricia Caswell Evans Chicago Parent and Son “Hooked” on IMSA Kids Program

Patricia Evans says IMSA's programs for youth seemed like the perfect fit for her son's passion for science and math. So when she saw information about an upcoming IMSA program, she did not hesitate to sign up.

“We immediately registered Nikosi for the *Illinois Magical Science Academy* which explored the hidden science behind literary magic,” she said. “It was themed after the *Harry Potter* series and took place over three consecutive Saturdays in March and April of 2006. Nikosi was hooked and so were we.”

Following this initial IMSA experience, Nikosi and his parents became loyal and committed followers of IMSA's programs in subsequent years, with Nikosi attending *Science Explorers*, *CSI: IMSA E2K+ Style*, *The Science of Halloween*, *Investigation Chaos Theory* and *Science@IMSA* residential program for boys.

“IMSA gave Nikosi early exposure to scientific theory and the fun side of science exemplified by the *Harry Potter*-themed series and the CSI program,” Evans said.

Evans said it was helpful for Nikosi, a student at Edison Regional Gifted Center in Chicago, to be with peers who shared similar interests.

“IMSA camps put him in touch with other children who shared those interests,” she said. “IMSA helped him to see the application of scientific theory and facts in everyday life.”



Nikosi Evans

– continued from page 17

Statewide Student Initiatives Spark Love of Learning

IMSA Kids Institute® Grows to Include Junior ALLIES

In addition to Summer@IMSA programs, the IMSA Kids Institute® provides weekend STEM programs that are fast-paced, hands-on and integrative. KI programs are designed and delivered by IMSA students (IMSA ALLIES) who serve as teachers and mentors to inspire younger students and ignite their interest in science, technology and mathematics.

IMSA Kids Institute® Junior ALLIES include junior and high school students from Illinois communities who assist with KI programs in their hometowns. In the past, Junior ALLIES have assisted with programs in Springfield and Lake County. This year Junior ALLIES also have assisted with programs in Carbondale and Chicago.

IMSA ALLIES, under the supervision of IMSA staff, also present IMSA on Wheels (IoW). This mobile interactive assembly-style show is presented free to elementary school students in grades 3–5 throughout the Chicagoland area and on occasion the 'wheelers' have traveled to Metro East, Olney and the Illinois State Fair in Springfield. Schools may contact IMSA for more information about the IoW mobile science theater and to request copies of the IoW DVD series.



To learn more about the IMSA Kids Institute programs visit <https://www3.imsa.edu/programs/kidsinstitute>.

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COMMUNITYNOTES

Scott Harman '95 is finishing his M.A. in Theatre History at the University of Illinois at Urbana-Champaign. He was awarded a university fellowship to begin his Ph.D. studies at the University of Wisconsin-Madison this fall. His work is centered on the intersection of cognitive science and actor training.

Jeff Underwood '97 started a video production company in 2008 and earlier this year, was awarded third place at an international media festival for a commercial he produced. See Jeff's interview about his project at <http://www.youtube.com/watch?v=yakvH-ZHaO8>.

In Memoriam

Martell Turner '01
5/5/1983–6/6/2010

Contribute to Community Notes Online!

What's New in Your Life?

Let us and your fellow IMSA classmates/colleagues know about what you've been doing! Have you recently started a new job or been promoted? Are you involved in new and exciting community service projects or other activities? Have you recently been published, honored or elected? If so, please tell us about it at: www3.imsa.edu/news/community-notes

FROM THE EXECUTIVE DIRECTOR OF PROFESSIONAL FIELD SERVICES

Michelle Kolar
Executive Director of Professional Field Services

IMSA delivers statewide professional development and enrichment programs to Illinois teachers and students. The Academy serves educators, schools and districts by providing inquiry-based professional development in science, technology, engineering and mathematics (STEM). IMSA also delivers STEM enrichment programs that stimulate interest, motivation and achievement of students. Our programs are held on IMSA's campus in Aurora, through our Field Offices in Chicago and Metro East, at locations throughout Illinois and online.

IMSA's professional development programs empower educators to create learning environments where students take ownership of their learning as they develop and answer their own questions about the world around them. Through relevant hands-on experiences, students develop a deeper understanding not only of academic content, but also scientific and critical thinking. These types of experiences prompt students to gain content knowledge and acquire lifelong skills that position them to take charge of their future.



IMSA's broad array of student programs includes in-school and out-of-school experiences that are held throughout Illinois. These STEM programs lay the foundation for students to develop scientific and mathematical capacities such as critical thinking, creativity, problem solving, collaboration and effective communication.

The diverse students who participate in IMSA programs connect with other learners and content in ways that might not be possible otherwise. They learn, grow and witness their potential together.

The cornerstone of our work is to collaborate with others and create innovative inquiry-based teaching and learning experiences. By working together, we can make a difference in the lives of Illinois students. We invite you to join us and learn more.

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The internationally recognized Illinois Mathematics and Science Academy® (IMSA) develops creative, ethical leaders in science, technology, engineering and mathematics. As a teaching and learning laboratory created by the State of Illinois, IMSA enrolls academically talented Illinois students (grades 10–12) in its advanced, residential college preparatory program, and it serves thousands of educators and students in Illinois and beyond through innovative instructional programs that foster imagination and inquiry. IMSA also advances education through research, groundbreaking ventures and strategic partnerships. (www.imsa.edu)





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