

NCSSSMST Journal

Volume 14, Issue 1

Fall 2008



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Student and teacher participants at the 2008 Student Conference at the Rochester Institute of Technology gather at Albert Paley's famous sculpture, The Sentinel, a 110-ton, 73-feet high, stainless steel-bronze work of art.

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NCSSSMST Journal is the official publication of the National Consortium for Specialized Secondary Schools of Mathematics, Science & Technology.

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Web site: www.ncsssmst.org

Postmaster: Send address changes and subscription requests to the NCSSSMST Journal, Central Virginia Governor's School, 3020 Wards Ferry Road, Lynchburg, VA. 24502 Subscriptions: Individual subscription price is \$50.00 per year US dollars and \$75.00 per year for international subscriptions with postage at an additional cost. Institutional Pricing is available by contacting NCSSSMST. Selected back issues are available for \$15.00. Advertising: Request information on advertising in the Journal from the Business Manager.

Editor's Note

By Dr. Ron Laugen

*Are you connected
to CCP?
Find out more ...
go to page 15.*

Many of us privileged to have worked in a specialized high school or program for ten years or more likely have been invited to attend a variety of class reunions. These fifth, tenth, fifteenth, twentieth, even twenty-fifth celebrations are very revealing in terms of what students recall and talk about. Of course there are the stories of who did what to whom "when . . ." But what has struck us in talking with alumni, whether it is over pizza with members of last year's graduating class, or over a beverage with a group gone for ten years, is the talk about relationships.

Strong relationships with their classmates are typically obvious. But special relationships with their teachers, counselors, administrators, and members of the Consortium community at large, are also demonstrated. In many ways, these special relationships are viewed as having been extremely important to their intellectual and professional growth.

Thus the idea for this 20th Anniversary special issue of the NCSSSMST Journal came about. We invited alumni from NCSSSMST schools to contribute articles about how their high school experiences influenced them in their academic and professional lives and the ways in which their high schools influenced the way they now see the world.

After reading the contributions included in this issue, it will be clear to you, gentle reader, that these writers value the impact of the relationships developed at their schools.

In this issue, you will read an array of reflections from NCSSSMST graduates who took different paths after high school – an astronomer, an Air Force fighter pilot, a graduate student in English, a climatologist. And for each personal journey captured here, consider how many more there are to tell.

We invite you to ponder your own situation – what are your alums' thoughts? Would it be useful to find out?

*Ron Laugen, Ph. D., is Co-Editor
of the NCSSSMST Journal and a
past president of NCSSSMST.*

President's Message

Dr. Jerald (Jay) Thomas

In October 2008, NCSSSMST Executive Director Cheryl Lindeman and I were the guests of Brooklyn Technical High School and its alumni foundation at *Sustaining Excellence: The 21/21 Campaign for Brooklyn Tech*. The gala event celebrated the 80th anniversary of Brooklyn Technical High School and served as a capital fundraiser to support curriculum, facilities, and faculty development. The Big Apple provided a most appropriate setting for the event. The evening's program included remarks from Brooklyn Tech's distinguished alumni and New York's educational and civic leaders, and entertainment was provided by the talented Brooklyn Tech choir led by Peter Yarrow.

By all measures and accounts, the event was a resounding testament to the transformative work that occurs daily at Brooklyn Tech, but, as I met and chatted with Brooklyn Tech graduates of all ages and professions, what became clear was how each successive class at Brooklyn Tech becomes part of a much larger community – a community of learners that reaches back almost a century and maintains a stake in the ongoing work and welfare of the school. This sense of community extends well beyond fond memories of classmates and teachers: it is a shared sense of ownership in Brooklyn Tech. I am sure that such is the case across the NCSSSMST membership, from schools with eighty year histories to those that have just graduated their first class.

Graduates of NCSSSMST schools are a highly mobile group – they travel, study, work, and reside in the most densely populated cities and in the most remote outposts on the globe. Nevertheless, they stay connected with one another. Graduates of Consortium schools constitute one of the tightest and most efficient alumni networks I've ever seen, and we should find ways to support that network.



L to R: Jay Thomas; Cheryl Lindeman, NCSSSMST Executive Director; Randy Asher, Brooklyn Technical High School Principal and NCSSSMST Board Member

In this issue of the *NCSSSMST Journal*, we focus on alumni – their careers, their stories, their successes. I am sure we are all able to speak to the post-high school successes of our graduates, and in these pages, we capture a few.

As you read these reflections I hope you will consider ways in which you might meaningfully engage your alumni and sustain their ongoing investment in your school. Many of our graduates are eager to give back – by teaching an enrichment course, by providing resources for our classrooms and labs, by serving on our boards of directors, and by advocating on behalf of STEM education.

As we partner in the coming year with the American Psychological Association and National Science Foundation in a pilot study that will ultimately assist us in systematically following our alumni, we also plan to add a regular alumni column in the NCSSSMST Journal. Please invite your alumni to submit an article. We hope that this issue and forthcoming articles keep us mindful that our graduates are our greatest resource.

Jay Thomas, EdD, is Associate Professor of Education and University Assessment Coordinator at Aurora University and current President of NCSSSMST.

Staunton

By B. Scott Gaudi, Ph.D.

Assistant Professor of Astronomy, The Ohio State University

Illinois Mathematics and Science Academy, Class of 1991



Scott Gaudi, Ph.D., is an Assistant Professor in the Department of Astronomy of the Ohio State University in Columbus, Ohio. He was a Menzel postdoctoral fellow in the Theoretical Astrophysics Division of the Harvard-Smithsonian Center for Astrophysics, and a Hubble Fellow and member of the Institute for Advanced Study, in Princeton, New Jersey. Dr. Gaudi was the lead researcher on an international team of scientists who discovered a solar system nearly 5,000 light years away that contains two gas giant planets that resemble a scaled-down version of our Solar System.

I grew up in Staunton, Illinois, a small town in the middle of the state about an hour northeast of St. Louis. Staunton is a rural community like many others in the midwest, populated by hardworking, down-to-earth people who value friends, family, and tradition. Staunton was not an easy place for someone like me to grow up and flourish. As a gifted, inquisitive kid who was more interested in books and science than football, I was an outsider in an environment where natural physical ability and adherence to tradition and the status quo was valued far more than intelligence, innovative thinking, questioning, and academic aptitude. At best, I was treated with a kind of curious respect by classmates and the community, but more often I was simply ostracized. I was lucky enough to have survived that phase of my life with my relentless motivation to learn and to excel intact. I persisted despite the continual pressure to conform to a standard that I didn't understand and didn't believe in. In many ways, I have my parents to thank for my tenacity; they were and always have been enormously supportive of my intellectual pursuits, and they pushed me to focus on my strengths despite these (and other) pressures. I'm not sure, however, that their support would have been enough to lead me to my current place in life had I not left Staunton and attended high school at the Illinois Math and Science Academy (IMSA).

At IMSA, I discovered a culture I never knew and could never have hoped existed, a culture where inquisitiveness was encouraged, individuality was cherished, and being a "nerd" was the norm. IMSA's effect on me was profound. The course of my life was irrevocably changed. At IMSA, I came to realize that I had been given a seed of potential, and it was at IMSA that I was found the fertile ground in which to sow that seed. I realized at IMSA that the reason I didn't fit in at Staunton

was not that I was missing something, but because I had something in me that other people either didn't have, didn't understand, or perhaps were simply afraid of: the constant and unceasing drive to learn, excel, achieve, and grow. IMSA forever instilled a fundamental and foundational belief and confidence in myself and my abilities, and the conviction that life is about the continual search for answers, the never-ending quest for self-actualization, and the lifelong pursuit of learning and inquiry.

Of course, many of these realizations remained unspoken and unformed in my mind while at IMSA and for years afterward. It was through the challenges I faced after leaving IMSA that I eventually become conscious of how my time at IMSA had transformed my outlook on the world. In particular, it was through the pursuit and ultimate realization of my lifelong dream to become an astronomer, a pursuit in which I had to bring to bear all that I had learned at IMSA, that I finally understood how different my outlook on life was from so many people. I finally understood why I felt so disconnected from my peers in Staunton, and I finally understood that the attitudes I encountered in Staunton were not relocated to such small, rural towns, but were in fact epidemic in our country.

The challenges I faced after leaving IMSA were not the challenges I was expecting. Based on my experiences at IMSA, where my potential was limited only by my own motivation, the only obstacle I was expecting was my own motivation to push myself to the limits of my abilities. Instead I found a formless, faceless, pervading, external opposition. I found myself mired in mediocrity; not a drive to excel or achieve, but rather a mindless, formless, and unspoken form of

inertia. I found myself fighting people who perpetuate mediocrity so that they never have to work hard and never have to look bad. I found myself fighting people who disliked me because I was driven and successful. I found myself fighting the attitude that I was too intense, worked too hard, or cared too much. These fights were not easily won: the enemy was very hard to define, pinpoint, and make explicit. There were times that, because of my inability to make concrete the opposition, that I began to question whether there was an enemy at all, or whether the enemy was me, my convictions and my beliefs. I began to wonder if indeed I was too intense, if I worked too hard, if I cared too much. But it was in wrestling with these tensions that my experiences at IMSA gave me the resolution to win these battles. Secure in my belief that self-actualization was a fundamental human right and a moreover requirement for happiness, I worked harder, and held on even more stubbornly and defiantly to my beliefs in myself, my abilities, my goals and my convictions.

I can't help but think that the struggles I faced growing up in Staunton, and the struggles I've faced since leaving IMSA, are just one aspect of the larger cultural chasm that is currently dividing our country. This chasm is apparent in many different arenas, but was exemplified by the dichotomous nature of the last three elections. However, I don't see it so much as a question of rural versus urban, red versus blue, or Republican versus Democrat. Rather, what I see is a fundamental difference between people who believe in an open, questioning, freethinking, and liberal society, and people who believe in a society that strictly adheres to traditional moral values and normative behaviors as the cornerstone of civilization. The former encourages inquiry and growth, whereas the later prohibits it, and in fact encourages just 'getting by.'

What is the ultimate cause of this cultural rift? I really don't know, but I think I have a clue from my own experiences. While I have ultimately had many successes, they have not been achieved, and the knowledge that I acquired has not been gained, without many failures along the way. So, I don't believe that my successes are primarily due to any kind of superior intrinsic ability. Rather, I think my successes are ultimately linked by the fact that I never stopped asking why, never stopped trying to achieve, never stopped trying to excel. Indeed, I have never (permanently) relinquished my basic morals and beliefs. I believe that all people are born with the natural inclinations to learn, to achieve, to question, and to strive, and the natural ability to excel in some area. It is only later in life, often under tremendous pressure to conform, that these natural inclinations are suppressed. I was doubly lucky, first because I had parents who fought against these pressures, and second because I attended IMSA, which forever enabled me to ignore these pressures. So, whereas I don't necessarily don't know how to avoid quenching the flame of human inquisitiveness, and so allow all people to achieve their potential, I do know that IMSA, and schools like it, are at least part of the answer.

Science and Social Justice

By Kohl S. Gill, Ph.D.

American Association for the Advancement of Science

Mississippi School for Mathematics and Science, Class of 1994

I was born and raised in rural, northern Mississippi. I went to a local school, the North Pontotoc Attendance Center, from first grade on. My family wasn't rich. On the contrary, my father labored at a local scrap yard for most of my life. At times, he was called back to India for family reasons, and we even spent some time on public assistance. We lived decently, if not lavishly, and tried to blend in for the most part.

I was always interested in math and science, but, then, I was interested in most all subjects. The expected path that my friends and siblings had followed was clear: attend a junior college or maybe Mississippi State University; make use of the best that Mississippi had to offer; perhaps become a doctor or an engineer.

The Mississippi School for Mathematics and Science (MSMS) came into my life at just the right time. The advertisements we saw on TV inspired me to apply, as much because it was free of charge as because of the great opportunity. I was lucky; Mississippi poses more of a financial burden on today's MSMS students.

I knew that I would get more and deeper science and math instruction at MSMS than at North Pontotoc, but I had no idea of the breadth of exposure to the world that the school offered. To think that in my little state there were other ethnic minorities as small as my own! I met my first Jewish classmate, my first Hindu friend - odd for and Indian-American, I know - and so on. I even befriended the most rare and dangerous species in Mississippi high schools: actual wealthy kids! The students were just the beginning and the instructors were phenomenal. Two of my teachers were great examples: Ms. Helen Perry and Ms. Judy Morris. They both expected way more of me

than I gave, and raised my sights in physics, and public speaking and leadership, respectively.

The whole approach of MSMS, the fact that they dispensed with the practice of ranking students against each other, the open and discursive style of discovery, and the residential atmosphere helped foster a type of collaborative problem-solving that stuck with me ever since. Ah, the extracurriculars! Did I take advantage of those! More than just the math and science competitions with which I'd been familiar from my North Pontotoc days, MSMS got me involved in debate, mock trial, as well as a run for student body president. One summer I even got to visit the Department of Energy's Fermilab in Illinois! It was at MSMS that the seeds of an idea were sown: that science and policy could be pursued in tandem. Most shockingly of all, Dr. Dewey's Judo class almost got me into shape.

To understand the atmosphere I experienced at MSMS, just take a look at the college application season. We were all under various amounts of stress: driving all the way to Atlanta to take a last-minute SAT exam; confirming all the required letters of recommendation from those stellar MSMS teachers; choosing which schools to approach; and getting the applications signed and delivered. The administration of MSMS was incredibly supportive, of course, but so were the other students.

I always think back to a time when a good friend of mine came to me with a suggestion. He'd gotten hold of an application to the California Institute of Technology - a school I didn't even recognize at the time, but which was apparently quite prestigious - and claimed that there was no way he would be able to get in. Since he didn't

want to waste it (all applications were on paper in those days), he offered it to me, thinking I would have a better chance to get in. I was quite honored by this act; I accepted, immediately. I was mostly applying to the schools my friends had chosen, so it seemed natural enough. Then I realized that it was due in a few days, so I completed it and rushed it out the door. The essays for Caltech weren't my best work, but they would have to do.

Because of the amazing preparation that MSMS provided, there were many options when we were choosing colleges. The initial plan was to find my way to Boston, but when the (largely need-based) financial aid offer from Caltech came back, there was no turning it down.

So that's how I got to Pasadena. I was really quite pleased to find a similar collaborative atmosphere among my friends at Caltech. Later, after meeting folks from other high schools, both public and private schools, I found out how lucky I'd been. MSMS prepared me exceedingly well for a top-tier science school like Caltech. The only trouble I ran into was the same that would draw me away from science repeatedly. I think it was my experience at MSMS that encouraged me to jump into student government in college, and I eventually ran for student body president there, too! Fortunately, this time I ran unopposed, so I won by default. Persistence pays off.

My southern accent, one of the most obvious elements of my Mississippian identity was lost in Pasadena. Sure, it still comes back now and again, but the joy in consistently getting two double-takes from new acquaintances - one for being from Mississippi and the other for being an Indian-Mississippian - was a treat while it lasted. It was then that I began answering the questions that would always pop up as an ambassador from MSMS: What's Mississippi like? Was it hard to grow up there? How did you leave? Would you want to go back? Representing Mississippi well, and forming true and coherent answers to those questions has never been easy.

Graduate school found me in Santa Barbara, California, pursuing a Ph.D. in semiconductor physics. Thanks in part to the influences of Ms. Perry and Ms. Morris of MSMS, I was still chasing the dream of merging science and policy work, but realized that I could use an advanced scientific degree for credibility. Finishing grad school would be tough, no less so because I wouldn't be doing research afterward, so I had chosen UCSB pragmatically, as a relatively apolitical campus, beautiful enough to make it easy to get up in the morning. Along the way I was able to study my family's language, Punjabi, getting only my second serious exposure to the broader Indian-American culture, after MSMS.

As graduate school was winding down, I decided to do some serious volunteer work. After the blossoming of interests at MSMS, my focus on academics and a few activities like Judo had become increasingly exclusive. I wanted to use the time between graduate school and my next, then-unknown position to do work of genuine importance to real people. Learning a bit of Punjabi had opened up India as a possibility, and I had heard awful stories of the corruption there. So, in true MSMS spirit, I struck out for Delhi to work on governance and transparency.

The anti-corruption work was some of the hardest I've ever done, and some of the most fulfilling. I could feel a part of my mind stirring - the rhetorical, paralegal, policy-wonk facet, passionate about social justice; it was a facet I'd last explored over 10 years prior at that amazing high school. I used that part of me to connect with groundbreaking organizations, to make immediate and lasting changes in the lives of extremely poor human beings. The startling successes I saw in Delhi revealed that pro-poor policy work in the developing world is not only important, but extremely tractable as well. It was also quite frustrating that the powerful legal tools available to Indian citizens make ours look like toys! With a bit of hustling and many frequent flyer miles, I managed to land a Science and Technology Policy Fellowship from the American Association for the Advancement of Science. This entailed a

two-year position as a senior policy analyst in Washington, D.C., for the Department of Energy's Office of Science. There I was dealing with Fermilab in a completely new capacity. How far I had come from visiting the laboratory as a high-school student from MSMS! I had the privilege to help guide the Federal policy-making process in a number of ways reaching far beyond typical energy concerns.

I recently acquired another AAAS Fellowship to work with the State Department, also in D.C. If all goes according to plan, I'll be returning to human rights work in their Office of International Labor and Corporate Social Responsibility, managing the programs in all of South Asia. I hope to use this next year to integrate relevant elements of science policy into the social justice scene.

It's quite clear how formative and lasting the influence of MSMS has been, especially in revealing my twin missions in science and social justice. I don't know if I'll be able to repay Mississippi for that inspiration. I only hope that my life in public service, as an ambassador from MSMS and the State of Mississippi, can somehow return the favor.

Momentum and Success

By William Kunz

Google, Inc.

Conroe TX ISD Academy of Science and Technology, Class of 1996

$P = MV$ - momentum equals mass times velocity. My physics teacher Scott Rippetoe taught that to me while I was attending the Academy of Science and Technology, and it has remained with me ever since. These days I think about momentum frequently, but not in the sense that I learned originally. The equation has taken on a new dimension for me. In life, one's momentum is proportional to one's velocity. Ironically, I am normally staunchly opposed to subsuming physics principles into philosophy. For instance, I imagine Newton turning in his grave every time someone pronounces, "For every action there is an equal and opposite reaction" as a metaphor for the concept of karma rather than simply saying "serves you right." However, the more experience I gain, the more I have come to believe and promote the idea one's success in life is a result of one's momentum.

What does this mean? Simply, success begets success and opportunity begets opportunity. This principle is something that I see at work in my own life. Currently, I have a job that I love with responsibilities that challenge and excite me. I work as product manager in a sales organization at Google. It is my dream job. However, I had applied to work for Google six years ago and they would not even give me the time of day. It was not until after I had attended Harvard Business School that I was able to convince Google that I would be a good candidate for employment. What changed? While I may now have more experience, my raw intelligence and talent has remained roughly the same these several years. I have wondered why I was "acceptable" this time but deemed "unacceptable" previously.

The answer to this perplexing question was something I learned in one of those epiphany moments during a class discussion at Harvard

Business School. The discussion topic was "Are stars made or are they born?" and we debated amongst ourselves as to whether people are born with the characteristics they need for success or whether people are groomed for success. The discussion was lively, the arguments were well reasoned, but the answer was elusive.

Prior to this discussion, I believed that stars were born; they were the product of hard working individuals in a culture of meritocracy where their talents allowed them to bubble to the top. However, after this eye-opening discussion, the answer was no longer quite so simple. I started believing that talent and hard work are necessary, but not sufficient, elements found in stars. No matter how talented or hard working someone might be, unless other people recognize that talent and hard work, that person will not become a star. Unfortunately, it is not humanly possible to accurately measure and judge the true talents and efforts of every person in any sizable organization. Because of this, people often rely on shortcuts for estimating a person's talents and efforts. Things like education, awards, job titles, etc. serve as crude proxies for determining one's talents and efforts. Other, supposedly better, measures of a person's talents and efforts such as peer feedback, performance metrics, and self-evaluations, are still inaccurate shortcuts to ascertaining someone's true talents, abilities, and efforts. In other words, in order to be recognized as a star, one must also excel at the artificial measures by which stars are assessed.

Anyone who has taken an SAT understands this principle. The SAT is not a true measure of a person's intelligence; rather, it is a proxy for intelligence used by colleges to sift through the myriad of applications they receive. By extension, if a

good SAT score gets a person into a good college, and a good college gets that person into a good job, then the ability to get a good job depends on one's ability to perform well on a test that is merely a crude approximation of one's intelligence. In other words, success (a good test score) begets success (entrance into a good college) begets success (attaining a job at a good company).

The phrase "on the fast-track" is another manifestation of this principle. Organizations have long recognized the difficulty and expense required to groom a person for succession. As such, rather than spreading this training across all employees, organizations focus their training on a few handpicked individuals. This training consists of giving these selected individuals successively larger responsibilities, which provides the rising star the necessary training ground for acquiring the skills needed for even greater responsibilities. In other words, opportunity (getting on the fast track) begets opportunity (getting a large responsibility) begets opportunity (getting an even larger responsibility).

So how does one get started on the fast track? How does one acquire the first precipitating success? As I reflect back to my own experiences, I can see that my initial opportunities and successes are things that I acquired over fifteen years ago even while I was still attending the Academy of Science and Technology. As I mentioned earlier, I currently have a dream job that I was unable to attain without first attending Harvard Business School. Harvard Business School took a chance on me because they saw a list of jobs and job titles at well-recognized organizations, like Oracle and Goldman Sachs, on my resume. My opportunities at those organizations were not possible without my education from an excellent Computer Science program at Carnegie Mellon University. Getting into Carnegie Mellon's Computer Science program was enabled by my experiences at the Academy of Science and Technology. Since admittance into top colleges requires that applicants differentiate themselves with something unique from the rest of the crowd, spending four years at an accelerated program that focused on science and technology provided

that necessary differentiation. Moreover, my experiences at the Academy of Science and Technology enabled me to not only survive but also thrive in the subsequent years, and provided the necessary first successes and first opportunities I needed to get started on the fast track.

One example of opportunities begetting opportunities is the experience I had at the Academy to practice my programming skills. The Academy served as a great training ground for what would eventually become my major area of study and employment. At the Academy, I was provided with a sound foundational education in computer programming, and then I was allowed the freedom to explore programming. I remember fondly the time when we learned in class about a certain programming technique that allowed me to write a program that I installed on a friend's school machine. This program would drop key presses if typed too quickly. This would annoy my friend, as it would seem that the keyboard was broken when he typed normally, but would work fine when he was trying to demonstrate the problem to other people due to his slower typing speed during his demonstrations. My laughing quickly gave me away as the culprit. I undid my nefarious test, and I was spared any stern rebuke for I had creatively implemented a principle taught in class.

The encouragement to try new things can only be done in an environment like the Academy where the teachers know their students well. Having the opportunity to hone my programming skills during my high school years enabled me to be one of the most proficient programmers during college. My experience and abilities in programming was immediately recognized by my classmates, and I was able to be selective on whom I would select as lab partners. Being able to work with the best peers provided me with the opportunity to learn from and network with other top programmers. Having the opportunity to work with the best meant my homework scores were always at the top of the class. Having the best grades at school opened up even more opportunities to work with the best people as well as a wide variety of research and job opportunities.

One example of success begetting success comes from my experience at the International Science and Engineering Fair, where I took first place in the Biotechnology division. I could never have succeeded here had it not been for the training and mentoring I received at the Academy. Not only did the Academy teach me the underlying science upon which the project was based, but also the soft skills associated with presenting the research that are necessary for selling the importance of the research. Winning the science fair enabled me to work on an impressive research project team during my undergraduate years, which led to several research co-publications. These publications, in turn, provided me with several exciting job offers.

Momentum is a powerful force. Once one's velocity has been established, the momentum behind that person will continue to push him or her along to greater and better opportunities and successes. I am so grateful for the Academy of Science and Technology for making sure that I left my high school experience at maximum velocity.

Connecting Consortium Professionals

The new Connecting Consortium Professionals (CCP) section of the NCSSSMST Website is designed for teachers, counselors, administrators, and other professionals at *member* institutions to share and collaborate.

Professional Conferences. We have archived our annual Professional Conferences, starting with 2006 - title, abstract, presenter(s), contact information – under the Professional Conferences tab. Starting with 2008, we have many presentations archived and available for downloading as well.

Curriculum Center. The Curriculum Center is the place where teachers submit and share unique and interesting projects, lab experiences and lessons. Your contributions are vital to its success.

Forums. In Forums you can connect with each other to post information and discuss topics of interest and concern. Use Forums to collaborate with colleagues across the Consortium.

Check CCP out! We hope these features, and the additional ones we are planning, enhance your life and work as a Consortium professional. Note: you need to have a ncsssmst.org password to access CCP. Contact rlaugen@ncsssmst.org for further information.

Thanks to affiliate member Neumont University for continued development and hosting support for CCP.

Opportunities

By Terri Estkowski

Graphic Packaging International

Kalamazoo Area Mathematics and Science Center, Class of 1990

For the last thirteen years, Terri Estkowski has called Graphic Packaging International her professional home. Currently she serves as the Senior Manager of Scheduling/Capacity Planning – Consumer Packaging in Concord, New Hampshire, where she is responsible for team forecasting and managing raw materials and production capacity for 28 sites for a \$2B division. She also contributes as a Six Sigma Master Blackbelt and Lean Leader.

Terri holds a Bachelor of Science in Engineering – Paper Engineering and Master of Science in Engineering Management both from Western Michigan University in Kalamazoo, Michigan, and certification in the Six Sigma continuous improvement methodology from the University of Michigan in Ann Arbor, Michigan.

In life, each person is offered opportunities, one after the other, until life ceases. For me, one of those opportunities was to attend the Kalamazoo Area Mathematics and Science Center, an NCSSSMST school. While attending KAMSC as a member of its inaugural class required a bit of imagination regarding the opportunity at hand, and since Kalamazoo, Michigan was just inventing this concept, I can say quite irrevocably that choosing KAMSC wasn't just the best choice for high school. It was the best choice for my life. Every single part of my life – college, professional, and even personal – has been touched by KAMSC.

KAMSC truly brought a smoother path to college. First, I received numerous offers to top programs, and, even more importantly for a child from a blue-collar family, tremendous scholarship opportunities. In an era of the average student loan burden exceeding \$30,000, I took no loans for either of my degrees in part through working, but largely due to academic scholarships. Second, KAMSC employed some tough teachers who truly saw every class as college preparation, regardless of whether the class bore the initials "AP" in its title. The homework load, content, level of instruction and clear need to self-start made the transition to college much easier, based on my observation of "normal school" peers. Third, I learned my limits. Attending KAMSC made me realize there were people smarter than me on the planet, and that I was never going to be as tremendously talented as them. However, I also saw that not all talent lies in academic performance.

One of the joys associated with being in the inaugural class was that the several teachers worked with us two or more years. To this day, Mr. Cameron Nichols, my math teacher for four

years at KAMSC, influences how I approach problems. He used to say, "Computers are incredibly stupid, incredibly fast, and incredibly accurate. People are incredibly smart, creative, slow, and inaccurate. Let computers do what computers do well and people do what people do well." In all of my college and professional experiences, I use this as a guiding principle – automate where it makes sense, apply brains where it doesn't. I also use this Mr. Nichols quote when I train and coach others on the continuous improvement curriculums of Six Sigma and Lean as it is truly about challenging how we use computerized tools in the work place. Further, Mr. Nichols introduced me to statistics and mathematical modeling. I regularly use these tools in my job and have built a career punctuated by my technical expertise in modeling and statistics.

Another icon of KAMSC culture was Mr. John Streeter, and I think in this day and age he would be labeled an "Information Technology" teacher. He would post the assignments and completions by students (his electronic grade book) on the bulletin board at the front of the room. The "wallpaper," as he called it, would be regularly updated with a speech from Mr. Streeter that went something like this: "The latest wallpaper is up, folks. For those of you are who behind, I suggest you get caught up before you become a bigger behind." In the world of work, I say the last sentence of this to myself regularly, usually with a chuckle and private smile, when I feel like my work is piling up without an end in sight. The quote reminds me that even when I'm becoming a "bigger behind," I can laugh and get on with the multitude of tasks at hand.

My KAMSC career started with Ms. Cynthia Addison. Ms. Addison taught Interdisciplinary

Studies and coordinated a program where interested seniors were paired with professionals in the region for real work experience. Without learning early about thinking in an integrated fashion, I wouldn't have the type of job I do today – helping a company change and improve the value it adds. Further, she essentially got me my first job in the paper industry, where I have been working for over 18 years. Ms. Addison paired me with a peer's father at a local paper company doing Research and Development work. That was the first industrial experience on my resume. This led to the highly uncommon reward of an industry-based internship as a freshman in college. While I may have gotten where I am today without her support, I still believe the road was easier with the first bricks laid by Ms. Addison.

My desire for a doctoral degree spawned from learning with Dr. John Goudie, biology and anatomy/physiology teacher. Dr. Goudie was Mr. Goudie when we first met him. He finished his degree while we were at KAMSC and led me to my own aspirations to be Dr. Terri Beck. As part of my personal twenty-year plan, now in year 13, I will get my doctorate degree. For now, the master's degree and a strong leadership position in a company I enjoy working for is keeping me quite busy enough. However, Dr. Goudie did inspire me to dream big in all things.

A school experience like the one I had at KAMSC is the ultimate life-changing opportunity. It brought me in contact with a different friend base than my small "normal school" in a largely agricultural area would have ever allowed me to meet. My peers were the children of professionals unlike any in my childhood exposure – professors, lawyers, doctors, and executives. My KAMSC friends' lifestyles showed me a different way of living, more culture, and a broader perspective. To this day, I have close and deep personal friendships with people I met at KAMSC, and they continue to inspire me to new heights.

KAMSC also influences my world-view the most in an odd way – philanthropy. KAMSC would not exist and persist without charitable contributions, so I persistently remember one of the highest impact opportunities of my life came through others' giving. Further, while at KAMSC we were encouraged to help the environment and community. This is a responsibility I never forget and regularly participate in personally, professionally, and academically.

In closing, every single part of my life has been touched by KAMSC, and absolutely for the better. Albert Einstein is credited with saying, "Experience alone can decide on truth." The truth of the matter is that places like KAMSC change lives. They provide a larger perspective and greater experiences than a student could find on his or her own in the "normal schools" of the world.

What's So Great About America?

By Capt. Kenyatta Ruffin, USAF

F-16 fighter pilot

Illinois Mathematics and Science Academy, Class of 1999

If your school was like mine, you stepped into an environment completely unique to any you'd ever known. What's an RA and where is the IRC? Why is there orange carpet everywhere and why don't the classrooms have doors? These and other unusual attributes soon became the essential fabrics that wove your new world view.

If your school was like mine, you soon stopped seeing black and white. No, I'm not talking about science, I'm talking about people. How could you be so naïve to judge a person so? Whether you were used to a mono-chromatic scene or a vibrant rainbow, the various hues and shades of your graduating class colored a beautiful portrait of the world you would soon inherit.

If your school was like mine, you probably wondered why you were using calculus in ceramics and applying physics to literature. A focus on mathematics, science, and technology never equated to an absence of other disciplines. In fact, you questioned how you could ever study Shakespeare without exploring Pythagoras. An "integrated" perspective and "discovery-based" method isn't something solely applied to academics, but rather created the paradigm you still use to this day.

If your school was like mine, age was nothing but a number. Is there an age that you are too young or too old to learn? Are you a freshman your first, second, or third year of high school? Just because you are a student does that mean that you are not a teacher or because you are a teacher that you cannot learn? Artificial constraints did not transfer with you to this environment.

If your school was like mine, you often asked, "What's that food?" as the pungent aroma filled the air. You soon discovered that it was an

authentic cuisine prepared by the parents of your fellow students. You quickly fell in love with the multiple festivals, celebrations, and events that represented the diverse cultures of your student body. And as you danced alongside them in traditional dress, you realized just how ignorant your prejudices were.

If your school was like mine, you saw people arrive in Mercedes-Benz and others exhausted from their walk from the bus stop. Some people wore the latest fashions and others wore the cheapest scraps they could find. Being from the other – dare I say, wrong – side of the tracks lost its meaning as you sat together trying to complete problem sets. After all, what does money have to do with intelligence?

If your school was like mine, you wondered to whom are they praying, and maybe even why? Whether it was the shouts of those gathered together or the quiet hum of someone alone in meditation, the evidence of peoples' different beliefs in God were all around – sometimes quite literally. No one persecuted you because of the cross around your neck, the shrine in your room, the bracelet on your wrist or quite frankly, nothing at all.

If your school was like mine, your reach certainly exceeded your grasp. Limits were made to be expanded and boundaries made to be explored. How can anyone tell you how high is too high or how far is too far? Did they also tell you that the world is flat? Well, it may be now, but that's because you and I *made* it so. You looked in the mirror and discovered that the only thing that defines impossible is the same thing that defies it.

If your school was like mine, being a liberal or a conservative wasn't simply just a red or blue

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issue, how could it be? It was clear that no single person, group, or ideology had a monopoly on right and wrong. Being a democrat or a republican didn't matter, but having the freedom to express yourself did.

If your school was like mine, the word "community" was far greater than the sum of its parts: common unity. You learned that the human element is the core of the complex experiment called life. The value and contributions of parents, students, teachers, counselors, coaches, assistants, janitors, etc. bonded to form the energy to overcome any force. Einstein may have written the equation $E=mc^2$, but we perfected it to simply you plus I.

If your school was like mine, admission came with a price – not a financial debt, but a moral obligation. Ethical leadership and service was engrained in your heart, your mind and your soul. You understand that great knowledge produces even greater responsibility. Regardless of your endeavor, your profession is serving mankind. You understand that great achievements are not about personal *accomplishment*, they are about personal *responsibility*.

If your school was like mine, then you'd know that we truly are the land of free and home of brave.

If your school was like mine, it was okay to say that we are "one nation under God" and yet okay to say that we are not.

If your school was like mine, you were encouraged to remain indivisible so that you could overcome any obstacle in your way.

If your school was like mine, you exhibited liberty and justice toward all – regardless of sex, race, color, creed, or national origin.

If your school was like mine, you pledged allegiance to something higher than yourself; you swore to serving the greater republic of humanity.

If your school was like mine, then you would have experienced what's so great about America.

Struggle and Achievement

By Xandie Gold, M.D.

Christiana Care Health System

Kalamazoo Area Mathematics and Science Center, Class of 2000

High school is, in many ways, an experience many would rather not relive, even in memory. As I reflect on my experiences at the Kalamazoo Area Math and Science Center (KAMSC), I am struck by how positive my memories are. For me and many of my classmates, our educational experiences up to that point had not been especially challenging, and were therefore somewhat unrewarding. Once we started at KAMSC that changed. It became commonplace to struggle, and, ultimately, to triumph.

I vividly remember working on my ninth-grade biology research paper, “Stem-cell transplantation versus autologous bone marrow transplantation for treatment of leukemia,” poring over journals at the local university library with college students eyeing me suspiciously. The sense of accomplishment when I finally was able to grasp what a journal article was saying, and even more so when I finished synthesizing multiple articles into one cohesive paper, was unlike anything I had previously experienced.

The relationship between struggle and achievement was one that stayed with me and ultimately helped me to succeed throughout the rest of my schooling. I am a firm believer in perseverance and that victory cannot truly be appreciated without challenge. It is a lesson that I must remind myself daily as a first year OB/GYN resident at an extremely busy hospital. In moments of frustration, I am able to remember how exhilarating it feels to prevail over a problem, to finally succeed at a difficult task.

It was not only that joy of overcoming a difficult situation that KAMSC taught me, but also how to deal with that situation initially. It was a new experience for me to have to ask for help, to become frustrated academically, to perform to a level lower than to what I was accustomed, and to be surrounded by students having the same experience and teachers who were willing to help. Learning to deal with the aggravation of not being immediately able to perfectly complete a task is certainly an

important lesson, and is extremely difficult to master for people at any age. I can only imagine it from the perspective of our educators—frustrated fourteen to eighteen-year-olds, used to everything coming easily, fraught academically for the first time.

The teachers at KAMSC were what made the education outstanding—they knew exactly how hard to push us, how to support without providing a crutch, how to challenge and encourage. After 21 years in some form of schooling, and who knows how many instructors, my two favorite teachers are from my years at KAMSC. They were by no means the easiest, nor did they teach my best subjects. In fact, the subjects they taught were two that I have barely revisited since, not at all during medical school, and only briefly while earning my B.A. in biology and creative writing.

I’m still not sure what it was about them that made them my favorites; it is a subject I have pondered often, as I teach medical students and undergraduates alike. I think that the most striking aspect was their unwillingness to accept anything but our best. You would never hear “I can’t” or “it’s too hard” uttered in their classrooms because every student knew that was intolerable. You could, and did, ask for help, often and repeatedly, and you were never alone, in frustration or in success. It was the challenge, combined with each teacher’s complete belief that we were capable of anything, that drove us to strive for more than we had imagined.

While college, medical school, my residency, and my personal life have taught me what to think and what to think about, I truly believe that it was my experiences at KAMSC, academically and socially, during my formative years, that taught me *how*. KAMSC provided a safe, comfortable environment for us teenagers at a seminal time, and I truly believe that it contributed greatly to the success of the past eighteen years worth of alumni, and will for many more for the years to come.

Xandie Gold, M.D., PGY-1
OB/GYN
Christiana Care Health System

A Classicist's Turn toward Science

By Jeff Sigler, Ph.D.

Atmospheric Research Scientist

Central Virginia Governor's School, Class of 1994

Some things never change. I've never been good at math. Not now, not in high school. I managed to get good grades in math, but largely because my father happened to double as a physics professor who could teach trigonometry to an orangutan. On the contrary, by the 9th grade, although I was interested in astronomy, I was overwhelmed with the humanities. While chemistry and geometry were mere trades, I found gripping joy in Shakespeare, the wives of Henry VIII, the psychosis of Poe, the heroes of various revolutions, the perpetual pillaging of Alsace and Lorraine. A glance at my bookshelf proves that these topics still capture my imagination. Some things never change.

But some things do. I'm not an historian, but an atmospheric scientist. How did this happen?

I suppose that through the 10th grade, I had not realized that something important was missing from my educational experience. I say my enjoyment of the humanities was "gripping," but unfortunately that is not a literal usage of that word. I now understand that while these topics are entertaining to me, they are not tactile. I cannot touch them, open them, perform experiments on them, or marvel at the mere idea, much less the act, of observing something that no one else has ever observed. These experiences are, however, inherent in scientific disciplines, but I did not truly begin to appreciate them until the 11th grade, when I enrolled in the Central Virginia Governor's School (CVGS) for Science and Technology.

When my turn at CVGS began, the Cold War was just over and the Berlin Wall newly crumbled, a very different George Bush was president, we carried neither cell phones nor iPods (heaven forbid!) though many of us still used Walkmans and listened to cassettes of our favorite hair bands

from the previous decade. It was long before the days of Facebook, Youtube, and even before simple e-mail and internet were common in schools. The fact that CVGS had, as any good science and technology-focused high school should, put itself at the forefront of such newfangled technological sophistication would become critical in my later academic success in college.

I was unprepared for what awaited me at CVGS. One month before the school year began, we were herded into vans and driven to the Virginia shore for an orientation of sorts – three days of environmental and biological data collection on beaches, and from the sides of various watercraft. This was a "jump in and see if you can swim" situation (literally, in some unfortunate cases) and required immediate use of instruments and techniques I was completely unfamiliar with. I had no idea what a turbidity meter was (or turbidity, for that matter), I did not know what *Spartina patens* was, much less how to identify it, and I did not know how to harness a seine net.

The CVGS teachers, while kind and supportive, were not anxious to hold our hands and give detailed instructions in these matters. "Try it yourselves," they said. And we did. In fact, the standard answers to just about any topical question I asked of a teacher at CVGS were along the lines of, "I don't know, Jeff. What does your Materials and Methods section say about that? What can you find in the search index? Do you think you might discover something if you press some of those buttons?" I say these things not as criticism, but out of appreciation, for two reasons: 1) one is at a decided disadvantage if one carries to college an over-reliance on teachers who spoon-feed answers and teach science purely out of textbooks and 2) while classroom learning is

Jeff Sigler is a 1994 graduate of Heritage High School and Central Virginia Governor's School for Science and Technology in Lynchburg, Va. He earned bachelor's and master's degrees in environmental science from the University of Virginia, and participated in NASA meteorological field experiments in the Amazon basin and Marshall Islands. In 2006, he earned a Ph.D. in atmospheric science from Yale University and is currently a post-doctoral research associate at the Climate Change Research Center, University of New Hampshire. His research focuses on mercury in the atmosphere.

important to training young scientists, there is no substitute for hands-on experience.

Who among us has ever been inspired by a physics textbook? How many scientists were first enchanted by their discipline while scrawling equations on a dry-erase board? Moreover, I have had some great science teachers, and they were not great because they could deliver an inspirational and stem-winding lecture on topics like island biogeography or angular momentum. A great science teacher not only has enthusiasm for a subject, but enables hands-on learning with available technology, learning by tactile and visual experimentation. This provokes the mind to new ideas in a way that a typical classroom lecture experience cannot, and can inspire a sense of wonder, independent learning and self-confidence from which a young scientist might someday spring. This started for me at CVGS and carried me through my experience as a teaching assistant in graduate school.

Some of the more fantastical things I experienced for the first, and perhaps only, time at CVGS include using time-lapse exposure to photograph light pollution, programming a robotic arm to pick up random objects, using an electron microscope to view onion cells, separating plant phytoliths from soil samples using a centrifuge, building a bridge out of popsicle sticks and applying stress until it shattered, piecing together a documentary using a video toaster, and using laser technology to produce a hologram.

Some of the less fantastical, but perhaps more important, things I experienced for the first time at CVGS include typing a login name, composing and sending an e-mail, cutting and pasting text on a word processor, joining an on-line discussion group, manipulating a spreadsheet, using desktop publishing software, saving documents to a disk, the heart palpitations and cold sweats that ensue when your computer fails and you realize you have neglected to back up the document you were working on, using a database to search for a specific article and then properly citing it in a research paper. And it must be said that our home high school peers, despite having excellent teachers, did not experience this same level of hands-on, technology-based learning as I did.

My experience at CVGS has been essential to my early career in science, considering it was my introduction to developing research methodologies, collecting and processing data, writing research papers, using spreadsheets and other computer software, learning to appreciate the joy of observing natural systems in something akin to real time, cultivating a healthier sense of skepticism. But it was not simply learning new ways of thinking and the experience with computers and other technology that really placed me at an advantage. We had a faculty that knew what they were doing. The atmosphere, curriculum and general approach to learning at CVGS were fundamentally collegiate.

There was no ringing bell to indicate the start of class, no one was constantly watching us although we were encouraged to make constructive use of our time, we were more likely to be encouraged to touch and use things than be told not to touch them, no one kicked us out of the computer lab if we were there after normal school hours. We were given syllabi which we were expected to follow, and this was our primary means of learning the due dates of assignments and the material we were responsible for. No one reminded us of what we were supposed to read, by when. During my first biology lab session, Dr. Cheryl Lindeman made some introductory remarks before getting to the task at hand, and asked the class what "CHNOPS" was, the answer being Carbon, Hydrogen, Nitrogen, Oxygen, Phosphorus and Sulfur – the six most important elements in biomolecules. We would have known the answer had we done the first reading assignment. But alas, not a single one among us had, because we had no idea what our syllabus was for. Her question was met with solemn silence. One student finally raised a hand and said, in all seriousness, "you mean, like, *peach* Schnapps?" This class of high-caliber 12th graders, many bound to be valedictorian or salutatorian at area high schools, could offer nothing better.

It was embarrassing, but a lesson was learned, and better learned in high school, I think. I was surprised by how far ahead of the game I was when I started college. I knew exactly what to do,

was better prepared than those around me, and was still ahead of the curve by the time I had declared a major (environmental science) and was taking laboratory courses. How sad to see so many pre-med and engineering students having to switch over to the history department because they were left behind during their first semester ("Test? We have a chem test today?" was a

refrain heard frequently in my dormitory suite). Without this great, practical benefit provided by a strong science and technology school with a clear intent to prepare students for a more collegiate style, I do not see how I would have been as successful academically in college, or how becoming a professional scientist would have been a natural choice for this amateur historian.

An Innovator and Lifelong Friend

By Glen A. Davis, M.D

Pediatrician

Kalamazoo Area Mathematics and Science Center, Class of 1990

While there is joy in reaching destinations and achieving goals, greater pleasure lies in the journey itself. This is an axiom that has been passed down through generations, and it must be internalized before a life can truly be well lived. I heard this adage many times during my teenage years. In the true spirit of adolescence, I do not think that I truly understood or appreciated it at that time. My eyes were firmly trained on a career in my field of choice – the field of medicine.

I am now just over ten years removed from my medical school graduation day. As a busy physician with the formal classroom seemingly miles away in my rear-view mirror, I can reflect upon my formal education and realize that I have been blessed beyond my wildest dreams. My good fortune began early, as I was admitted to some of the nation's finest undergraduate degree programs in both the Ivy League and on the West Coast. I ultimately accepted admission into one of the nation's top ten medical schools directly from high school via a rigorous program known as Inteflex, a 7-year combined undergraduate/medical school program at the University of Michigan which accepted approximately 7 percent of its applicant pool during my year of admission.

Graduation from medical school was followed by residency training in pediatrics at the Children's Hospital of Michigan, the third oldest children's hospital in the United States and a storied institution in its own right. Despite these heady accomplishments, the most valuable time period during my years of schooling did not occur on a university campus, nor did it occur in the hallways of a major hospital.

To the surprise of many, I tell anyone who asks which institution provided me with the best educational experience that my high school years were the most important and rewarding time period

during my academic career. This is true because I had the privilege of being educated at the Kalamazoo Area Mathematics and Science Center (KAMSC) during those formative years. Both my interest and aptitude in the disciplines of mathematics and science were exceptionally high during middle school, but with that interest came an awkward feeling that it may somehow be "uncool" to have a special interest in these subjects. It became obvious during those early teen years that asking extra questions in science class was not welcomed by classmates and would not be a ticket to the upper echelon of the teenage social hierarchy. Unlike the typical high school, KAMSC provided an environment that was the perfect fit for me as an inquisitive yet insecure teen. Our teachers were always full of enthusiasm and willing to answer the extra question during class. Any question that had not been answered fully in class typically spawned a mini after-class seminar, with several students surrounding a teacher for an invaluable exchange of ideas. That was the norm at KAMSC.

KAMSC also taught me how to use the latest technology to help solve problems. Throughout my high school years, the latest technological advances available were always at my fingertips. Every KAMSC student was required to purchase a scientific calculator with the ability to graph algebraic expressions (financial assistance was offered to help those who could not afford one of these units to obtain one). Computers on every desktop were the rule, not the exception. The latest version of the Apple Macintosh computer was available on every desk in the building, with a phenomenal student-to-computer ratio of 2-to-1. An electron microscope was donated by the Upjohn Company, making KAMSC one of two high schools in the country with this type of microscope on-site. The numerous high-powered microscopes available in the biology lab made it

Dr. Glen A. Davis graduated from Kalamazoo Area Mathematics and Science Center in 1990 as a member of KAMSC's first graduating class. He then completed his undergraduate and medical school degrees at the University of Michigan, and completed his pediatric residency at the Children's Hospital of Michigan. He is currently a general pediatrician in South Bend, IN. He also hosts a TV segment called "Ask Dr. D?" every Friday morning on WSBT-TV, the local CBS affiliate in South Bend.

possible for my biology teacher to give lab-based microscope slide testing that is nearly unheard of at the high school level. These tests involved students being tested on identifying different types of tissues and cells under a microscope, then answering a few questions about that tissue or cell before moving on to the next microscope station at 90-second intervals. Learning how to study for this challenging type of examination prepared me for rigorous premedical and medical school curricula, which also utilized this examination method, years earlier than my counterparts hailing from exclusive suburban school districts and East Coast preparatory schools. There is no doubt that much of the technology that I used while at KAMSC is now considered obsolete, but it helped me realize that technology is a powerful force that is always moving forward at a rapid pace. Those who fail to adapt to modern technology quickly become irrelevant. Learning to adapt to technology so that I can use it to my benefit is a life skill that I first honed at KAMSC.

Another valuable component of the KAMSC experience was the daily interaction with my talented classmates. It has almost become cliché for elite universities to say that the best part of being at their institution is interacting with the student body, but at KAMSC it is true. I have been surrounded by some of the most brilliant minds on the planet throughout my training, but I can say without hesitation that my KAMSC classmates were the brightest group of people with which I have had the privilege to study. We all had our own unique talents, but first and foremost, we all loved to learn. A love of knowledge that is more potent and contagious than the learning is “uncool” attitude that still has a stranglehold on far too many classrooms today. One look at the list of alumni and their accomplishments will show this to be true. My classmates have moved forward and attended some of the finest institutions in the country. All are quite successful, with a broad spectrum of chosen career paths that include internet entrepreneurs, leaders in nanotechnology research, college professors, Space Shuttle astronauts, software developers, and . . . yes . . . a general pediatrician in South Bend who fondly looks back upon his years at KAMSC as being a special time in his life.

Despite her academic prowess, the heart and soul of KAMSC lies with her people. The teachers, students, and alumni remain united and committed to maintaining KAMSC’s excellence. It remains a place that I can return to and know that I will be welcomed with open arms. I have called upon former teachers quite often to ask for career advice, and they continue to serve as mentors when called upon. On a more personal level, my former KAMSC instructors have been present in my life during both good times and bad. I remember celebrating with my former KAMSC teachers at my wedding, and finding comfort in their presence and words at the funerals of both of my parents. Many organizations boast of being a family, but when you look behind the façade you see gross dysfunction gnawing at the foundation. I can honestly tell you that my KAMSC family is strong and continues to be a resource for me to this day.

I salute KAMSC and thank her. She has nurtured me and watched me grow, as my experiences have taught me to respect and honor the quest for knowledge. At a time when our country’s ability to effectively provide math and science education has been questioned, KAMSC has served as a veritable beacon of hope where many bright and dedicated students continue to explore, learn, and share ideas. The KAMSC alumni roster has grown to reach a critical mass that will allow us to become a tangible force in improving our society. I fully expect for someone from KAMSC to win a Nobel Prize during my lifetime. The thought of a KAMSC graduate starting a corporation that bolts into the Fortune 500 will also likely become a reality. Most importantly, I hope that KAMSC graduates and all educated people with a zest for learning can use their knowledge to help solve the problems of this new millennium.

With knowledge comes power, and that power cannot be abused. As my KAMSC calculus instructor correctly stated, “It’s nice to be important, but it is also important to be nice.” The problems that face our society seem daunting, but we have creative minds that can leverage our ever-expanding knowledge base to solve those problems. I trust that we can look back towards KAMSC, an innovator in the education of gifted high school students, as a source of inspiration as we forge ahead.

Welcome Home, Harry (Henry)

By Mia K. Markey, Ph.D.

University of Texas Department of Biomedical Engineering

Illinois Mathematics and Science Academy, Class of 1994

My six-year old son, Henry, has recently discovered Harry Potter. As we prepare to head back to IMSA for homecoming for the first time that Henry is able to remember, I find the analogy of Hogwarts for IMSA to be apropos for explaining to him where we are going and why. While I am sure many from IMSA have noted the parallels, they're particularly compelling when one could easily pass for a Weasley. I've red hair; I'm one of four kids in my family to attend IMSA, and I had my share of hand-me-down robes, if you know what I mean.

There are other aspects of my IMSA experience that are quite un-Weasley like, however. The Weasleys are an old Wizarding family, but my family is, well, from the Muggle world. I grew up on small farm along the Mississippi, close to where the states of Illinois, Iowa, and Missouri meet. The only people I interacted with on a regular basis who had been to college were my schoolteachers. In Dallas City, many people were hard working, and some were quite bright, but few were educated. In retrospect, I've often thought that it was for the best that I was especially naïve. When I decided in the third grade that I wanted to be a scientist, no one bothered to explain to me how impossible that was, any more than they had done so in response to my earlier stated intention to be an Olympic gymnast. Going to IMSA opened doors for me that I hadn't even known were closed.

Yet it's not easy to pin down what made my IMSA experience magical. Certainly there are some elements that are structural, a direct result of curriculum and pedagogical strategies. Unbelievable as it may be to students currently enduring high school in any form, there are honestly aspects of my educational experience at IMSA that I remember nearly 20 years later. I am

not referring to the simple fact that I know general information that I realize must have been assimilated in that time frame of schooling; I mean I really remember specific class sessions, and expect I will remember for them for the whole of my life, in which I first learned a concept.

How could I forget the experience of recreating in Bill Stepien's American Studies class the US Supreme Court case of the National Socialist Party of America vs. Village of Skokie? Or the excitement of piecing together in John Eggebrecht's organic chemistry course what really happened to Ryan Stallings? Moreover, I have many poignant memories of teachers who changed my life in little ways that they probably didn't realize then or since. David Workman, cleverly saving my pride by trading physics tutoring by him for Unix tutoring by me. Ed Goebel, humoring me when I would brag about getting the MMWR by ftp before he could get it in the postal mail.

Even now if I am frustrated by something that I am working on, I deliberately think back to John Alexopoulos's impassioned argument to my pre-calculus class that any of us could do math. Likewise, I don't think I would have made it through my college studies without the self-confidence cemented by the experience of not realizing until halfway through the semester of the Introduction to Programming (Pascal) course at IMSA that I was the only girl in the class; I had never noticed because Michael Sloan treated me the same way as he did every other student.

I can only hope that I bring to my own teaching a fraction of the energy and dedication that I experienced from so many of my instructors at IMSA. At the least, I think it's fair to say that I picked up a bit of their bravery to try to new

things in the classroom. Mobile technologies, personal response units, podcasting – been there, done that. I'm what the School of Engineering calls an "early adopter."

Then there are all those extracurriculars. Drama Club, Swing Choir, and Club Pseudo were surprisingly good preparation for lecturing to large classes and presenting my research, though I shudder to think of the parodies that my students must sing about me when I remember a few we made up about our IMSA teachers' foibles. My work service experiences with Ron Pine and volunteer efforts supporting computers under Chuck Maddox and Scott Swanson's guidance were seeds for my eventual career as a biomedical engineer.

It seems amazing to recall that I literally didn't even know how to turn a computer on when I arrived at IMSA as a sophomore. I don't think it's that much of a stretch to credit my experiences through the mentorship program at IMSA with laying the groundwork for my record-setting time through my Ph.D. program at Duke. Through the mentorship program [now called Student Inquiry and Research], I was able to get a taste of research by bungling my way through a project in Michael LaBarbera's lab at the University of Chicago. I learned a tremendous amount about the culture of research, such as how to get grad students to give you access to their equipment, which served me very well later in my undergraduate research and subsequently in grad school.

Whenever I start to wonder what madness struck me that I agreed to advise a high school student in my own lab, I think back to Prof. LaBarbera's patience with me, and give it another go. I'll even admit that I've come to respect residential life staff, whom all IMSA students love to hate, through my pathetic efforts to reach out to undergraduates through programs administered by residential life at the University. Their charge is important, if seemingly impossible, and in hindsight, I admire them for even trying. Just so long as I never have to attend Playfair ever again.

When my older sister, Michelle, the first of the Weasleys to attend to IMSA, headed off to the little school on the prairie, one of my uncles opined to my parents that the most important part of the

experience would be the people that she would meet there. Seeing as I met my future husband at IMSA, as did Michelle, it's a bit hard to disagree with my uncle's sage opinion. (Under duress, I'll even admit that I met my would-be husband at Playfair.)

But that is too flippant. In truth, the friendships I formed at IMSA shaped me more than the friendships of any other age of my life to date; I wouldn't be who I am without them. Moreover, the commonalities of the IMSA experience, highly variable though they may be, have been the root of several friendships launched with IMSA alumni who I didn't know well or in some cases at all when I was a student at IMSA. Much as I longed to go to IMSA and enjoyed my time while I was there, the passage of time was necessary for me to appreciate this true value of the boarding school at the end of the long train ride (Amtrak, not Hogwarts Express).

Sure, there were downs as well as ups to my IMSA years, but this is not the place to air our dirty laundry, and a few smelly socks worthy of Dobby doesn't change the fact that taken in total, IMSA is a place of magic. Thus, while there are admittedly some notable ways in which Hogwarts is superior to IMSA, such as the serious lack of secret tunnels and invisibility cloaks at IMSA that would have been very helpful for "illegal intervisitations," I would be delighted if some day my own children were to attend IMSA.

Which is all a long way of saying that when we take Henry back to IMSA for Homecoming in a few weeks, I think I'll quote my favorite movie poster for the Chamber of Secrets, which said, "Welcome home, Harry."

Acknowledgements: While the opinions expressed herein are mine alone, I am indebted to several family members who kindly read drafts and attempted to persuade me to edit appropriately, which I ignored at my peril. Many thanks are due to in particular to Mr. Eric Stuckey (IMSA '93), Dr. Margie (Markey) Snyder (IMSA '00), and Dr. Michelle (Markey) Butler (IMSA '90). The other Weasleys would have happily done their best as well to curb my candid nature had I not procrastinated as if I were still an idealistic, young IMSA student instead of a cantankerous, old professor.

An Alternate Route: An Open Letter to Despairing Magnet School Students

By Kathryn VanArendonk

Kalamazoo Area Mathematics and Science Center, Class of 2003

I have to admit that I was pretty surprised to receive an email asking that I submit a piece of writing about What My Magnet School Experience Has Done For Me. By the status on my current alumni information page, I would consider myself the least relevant former student from whom to solicit a commendation of my time at a magnet school. I attended the Kalamazoo Area Math and Science School and graduated in 2003 and am currently a graduate student at Stanford University (attendance at a distinguished institution, graduate school – so far so good), but I am enrolled in the Ph.D. program for English Literature. Cue the sound of a record player needle falling out of groove.

But I'm actually pretty pleased to have the opportunity to write this, because it's certainly something I've thought a lot about over the last several years. It's a question I've gotten many times, mostly in interview situations – you attended a math and science magnet school? Why are you interested in English literature? What's that about? And the answer is that my Magnet School Experience had a huge effect on what I've decided to pursue and where my interests currently lie. As soon as I finished high school, I went to Kenyon College, home of the renowned literary magazine *The Kenyon Review* and a place of truly excellent liberal arts teaching. I decided to go to graduate school and am now thrilled to be where I am, studying the Victorian novel and basking in the California sun. In other words, I examined my experience at magnet school and decided to run, as fast and as far as I could, in the opposite direction.

The transformation was gradual. KAMSC is a four year program, and during ninth and tenth grade my goal was to do as well as possible in my biology

and pre-calculus classes, although it quickly became apparent that it was going to be much more difficult than originally anticipated. Things started slipping around chemistry and trigonometry, and by the time I got to eleventh grade my parents had the sense that completing KAMSC was for me an act of willpower without much affinity for the subject matter. This was by no means a failure of teaching, a reaction to a difficult social situation, or a default in the KAMSC program – most of my best friends went there, I was happy to hang out in the lounge between classes, I loved having a much smaller educational environment than the one offered by my home school, and to this day I look back on Mr. Sinclair's astronomy and geology courses (Stars and Rocks) as among my favorite classes.

What quickly became clear to me, though, was that I was just not into math and science. And I have to say, to this day I am thankful to KAMSC for making it as obvious as it became. It may seem as if the most I can say for my education there is that it made it ridiculously easy for me to pass my Qualitative Reasoning credits in college, but the truth goes much deeper. I'm not sure I would have figured out what I really wanted to do as rapidly or as assuredly as I did without some pretty rigorous forces pulling me the other way. I was able to go to college with a much more solid sense of what I wanted to do, which allowed me to focus and gave me a strong sense of self that has served me well in the past years.

If anything, I think KAMSC may actually have been more important for me than it was for the multitude of its alumni who have gone on to math- and science-related careers. My boyfriend of five years, also a KAMSC alumni, is currently a graduate student working towards his Ph.D. in

Kathryn VanArendonk is a doctoral student in English literature at Stanford University.

organic chemistry, and as important as KAMSC was for him, it was essentially just one in a series of stepping stones leading him to where he is now. I have no doubt it helped him to get into prestigious universities and get the internships he wanted, but it has been a link in a long chain of science education, and so its significance in the scheme of the whole is not as readily apparent to him as it is to me. For me, KAMSC was not part of a continuation along a straight line, but instead marked a sharp right turn away from what I initially considered to be my interests – KAMSC showed me the way forward in math and science, but it simultaneously offered me the possibility of an alternate route. It helped define me in the negative space of what it was not, and it was undoubtedly one of the most influential and significant educational experiences I have ever had.

I come now to the subtitle of this essay, “An Open Letter to Despairing Magnet School Students.” I have no doubt that in the midst of the teeming swarm of happily working students at math schools, specialized art institutions, at music conservatories and engineering programs, there are a few who are wondering what on earth they’ve gotten themselves into. Each day they become more and more certain that the last thing they want to do with their lives is be a professional statistician, and to these students I say – have hope! This may seem to be a terrible moment where you realize you’re doing something you don’t want to do, but the incredible upside is that you can now confidently search for an alternate route.

Good luck,
Kathryn VanArendonk

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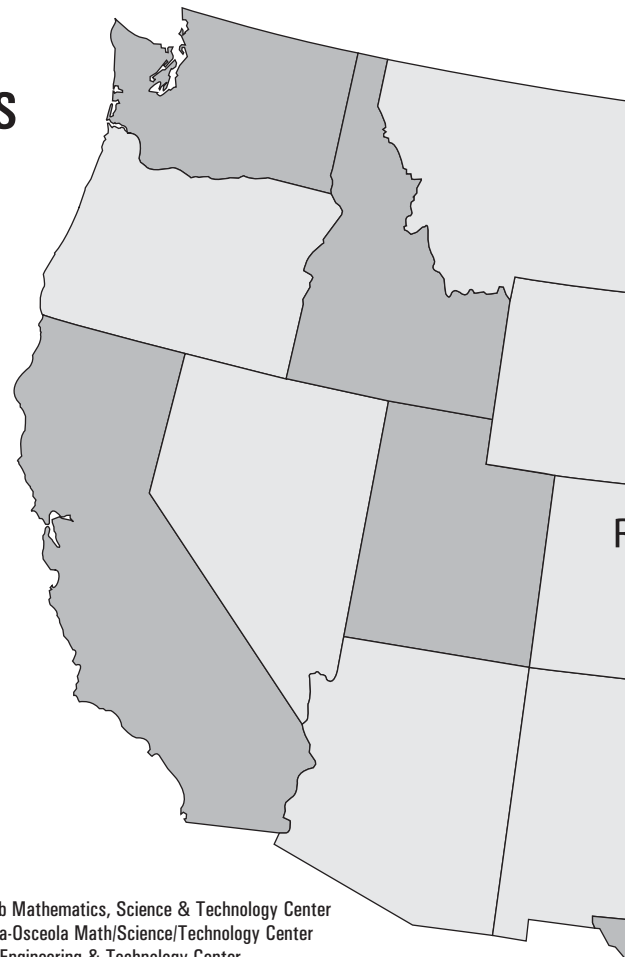
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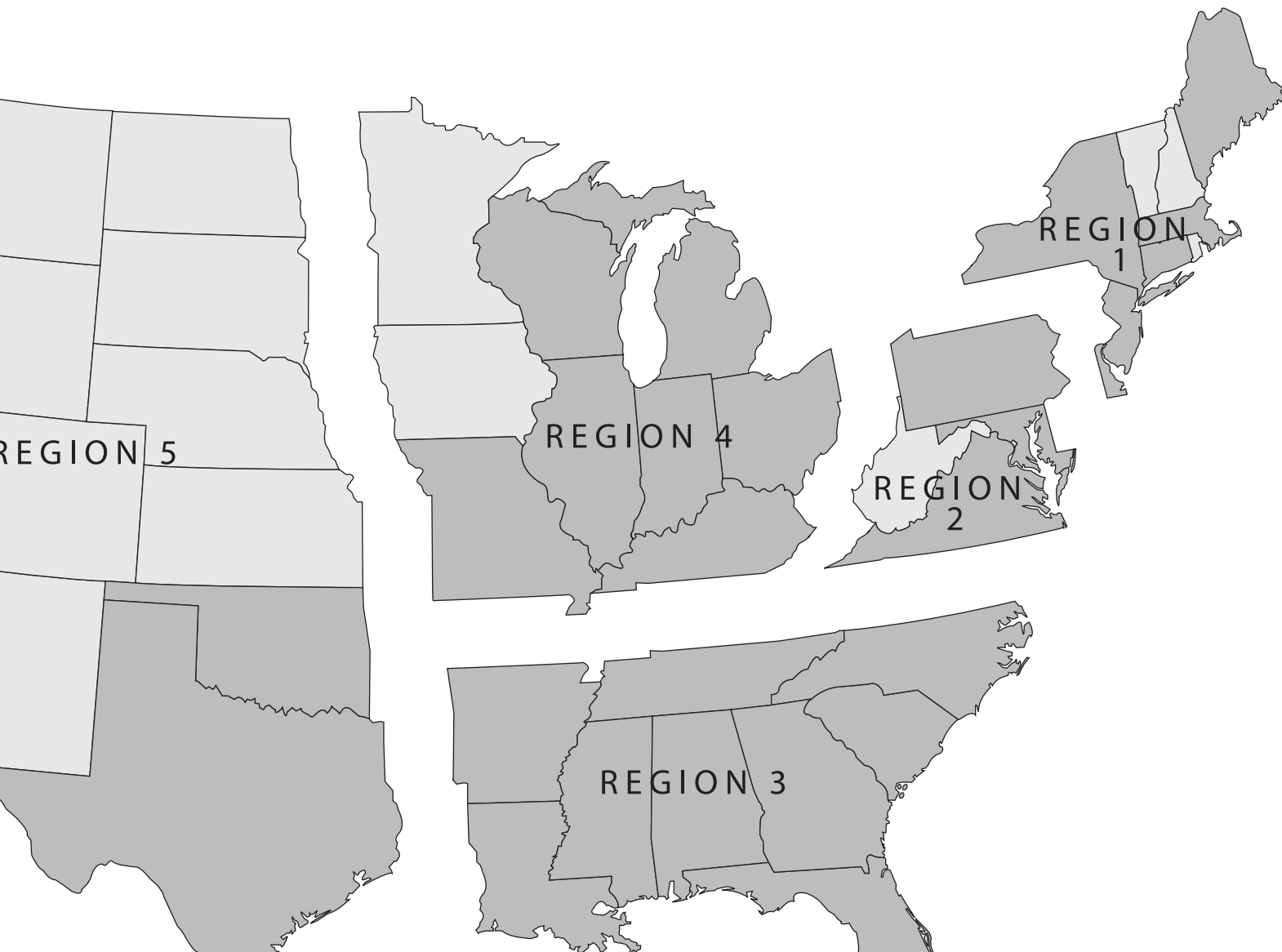
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Editorial Scope The purpose of the journal is to provide a forum for the discussion of innovation in secondary mathematics and science education and to disseminate information about Consortium member institutions.

- Objectives**
- To publish feature articles related to innovation in secondary mathematics and science education. Topics may include interdisciplinary curriculum; implementation of reform standards; infusion of technology into curriculum; creation of student centered active learning environments; original research of mathematics and science pedagogy; theoretical or conceptual positions; connections between science, mathematics, technology and society; connections between research and practice; discussion of current issues in mathematics and science education; and development of community and higher education partnerships. See feature article summaries on web site.
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 - To provide a forum for Consortium students to report abbreviated results of their original research. See student research summary guidelines in the next section.

Directions to Contributors Submit two copies of your manuscript, typed double spaced on 8 1/2 x 11" paper. Manuscripts should be between 12 and 24 pages in length and must conform to the style of the current publication manual of the American Psychological Association available from APA, 1200 Seventeenth Street, N.W., Washington, DC, 20036. Submission of computer readable copy will facilitate the manuscript review and publication process. Please send an electronic version preferably in MS Word format. The name(s) and affiliation(s) of the author(s) email address(es) should appear on a separate cover page. To ensure anonymity in the review process, names of author(s) and affiliation(s) should not appear elsewhere in the manuscript. An abstract of 100-150 words should be typed on a separate page. Manuscripts that do not conform to these specifications will be returned for proper style change.

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- ☐ Cover letter signed by all authors
- ☐ 2 paper copies
- ☐ APA format used for all citations and references cited
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The manuscripts should follow the format of a research paper written in an abbreviated form. Manuscripts must include the following sections: Abstract, Introduction (encompassing literature review), Methods, Results, Discussion and Conclusions and Bibliography (APA format). The total number of tables, figures, graphs, pictures, etc., submitted with a manuscript is limited to three.

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About NCSSSMST

The National Consortium for Specialized Secondary Schools of Mathematics, Science & Technology (NCSSSMST) was established in 1985 to serve educators and students in the growing number of specialized high schools throughout the United States. NCSSSMST is a forum and clearinghouse for the exchange of information and program ideas among faculty, staff, and students from member schools and affiliated organizations.

The Consortium comprises a network of research and development secondary schools with strong college and university affiliate members. As of December 2008, the 100 member schools and centers located in 31 states enroll more than 37,000 students. Each member school addresses specific needs of its area, and most serve districts or states, depending on their charter. Two associate institutions are in the process of developing new schools. Over 90 colleges and universities are members and participate in program-related activities or sponsor special events.

Brief History Seeking to increase communication among the mathematics, science, and technology specialized schools, four such schools—the North Carolina School of Science and Mathematics, the Thomas Jefferson High School for Science and Technology (VA), the Louisiana School for Math, Science and the Arts, and the Illinois Mathematics and Science Academy—hosted an organizational meeting in the spring of 1985. Representatives from 15 schools attended, and NCSSSMST was founded to foster growth and interaction among similar programs.

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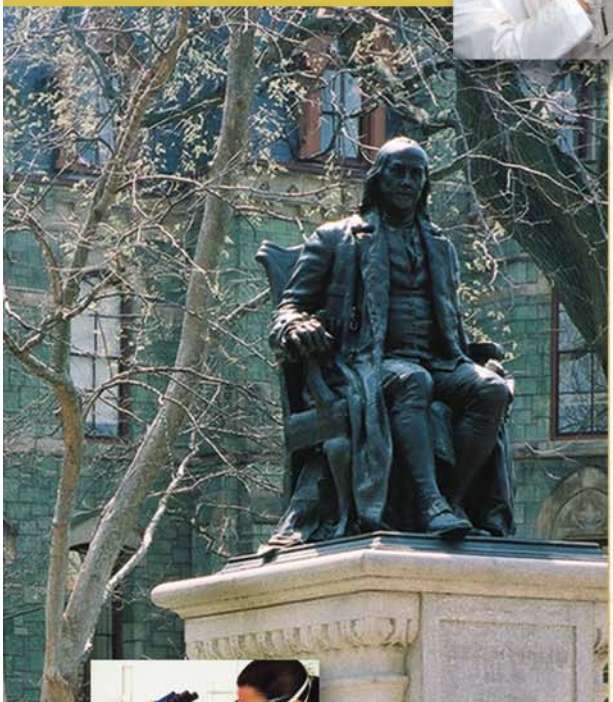
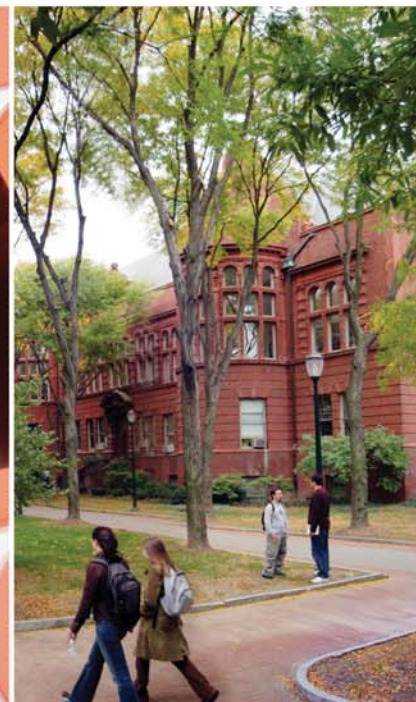
- Newsletter — published three times a year
- NCSSSMST Journal — a juried forum (published twice a year)
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- WWW site—www.ncsssmst.org—organization's link on the site

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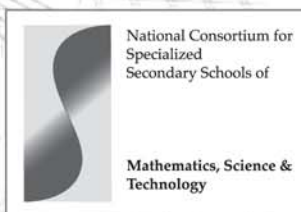
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