



FUNDING THE **FUTURE:**

Advancing STEM in Israeli Education

December 4, 2012

8:00 am – 4:45 pm

The 3 West Club

3 West 51st Street

New York, NY 10019



Rashi Foundation
קרן רש"י



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FUNDING THE FUTURE: ADVANCING STEM IN ISRAELI EDUCATION

December 4, 2012

8:00 a.m. – 4:45 p.m.

All sessions are in the Grand Salon on the 3rd floor unless otherwise indicated

AGENDA

8:00 a.m. – 8:30 a.m.

Coffee

8:30 a.m. – 9:00 a.m.

Welcome, Introductions and an Overview of the Current Israeli Education System, Its Aspiration and Challenges

- Itzik Turgeman, *Director General, Rashi Foundation, Israel*
- Eli Hurvitz, *Executive Director, Trump Foundation, Israel*

9:00 a.m. – 9:45 a.m.

Framing the Issues: Strategic Philanthropy Leading STEM Education

- Michele Cahill, *Vice President, National Program, and Program Director, Urban and Higher Education, Carnegie Corporation of New York*

9:45 a.m. – 10:45 a.m.

Panel: Design for Success

Panelists address the importance of Systems Design in the work of building STEM schools and networks and fostering the innovation that is critical to program success.

- Larry Rosenstock, *Principal, High Tech High, San Diego, CA*
- Barak Ben-Eliezer, *CEO, Winnovation*
- Moderator: Jan Morrison, *CEO, TIES*

10:45 a.m.

Break

11:00 a.m. – 12:00 p.m.

Small Groups: Innovative Strategic Philanthropy Leading STEM Education

Participants will select one of the following small group discussions:

Topic 1: STEM Teacher Recruitment and Retention, *Grand Salon, 3rd floor*

- Talia Milgrom-Elcott, *Senior Manager of STEM Teacher Initiatives, Carnegie Corporation of NY, 100K in 10*
- Asaf Banner, *Teach First Israel*

Topic 2: STEM Teacher Certifications, Building a Culture of Innovation in Training STEM Teachers, *Grand Salon, 3rd floor*

- Arthur Levine, *President, Woodrow Wilson Foundation*
- Eli Hurvitz, *Executive Director, Trump Foundation, Israel*

Topic 3: Adding the Missing “S”: Creating STEM Leadership for a Better Society, *Lincoln Room, 4th floor*

- Liat Ben David, *CEO Wolf Foundation, Israel*
- Yariv Bash, *Founder/CEO, SpaceIL*

Topic 4: Beyond the Schools: Informal and Distance Learning and STEM, *Library, 4th Floor*

- Kathleen Traphagen, *Informal STEM Consultant for private philanthropies*
- Itzik Turgeman, *Director General, Rashi Foundation, Israel*
- Gila Ben-Har, *CEO, Center for Educational Technology in Israel*

AGENDA *continued*

- Topic 5:** STEM Education and Workforce Development, *Solarium, 9th floor*
- **Sam Pinto**, *President, Alliance-Kol Israel Haverim (KIAH)*
 - **Mindy Feldbaum**, *CEO, Collaboratory LLC / Former Director for Workforce Development Programs, Academy for Educational Development, US Department of Labor*
 - **Stephen D. Shapiro**, *Chair, International Advisory Committee of the Ahed High School for Science, Negev Bedouin / Board Member, UJA Federation of NY*
- 12:00 p.m. – 1:00 p.m.** **Lunch and Facilitated Discussion**
- 1:00 p.m. – 2:00 p.m.** **Panel: Creating a System to Support STEM Education**
How are existing STEM programs' assets mapped and networked? How can the creation of a STEM education system in Israel address the needs of the schools while building Israel's place in the world market? How can private philanthropy set such a system in place?
- **Suzanne Immerman**, *Director of Strategic Partnerships, US Department of Education*
 - **Gerald Solomon**, *Executive Director, Samuelli Foundation*
 - **Ofer Rimon**, *Head of Science and Technology Division, Ministry of Education, Israel*
 - Moderator: **Richard Rosen**, *STEM Fellow at Johns Hopkins University*
- 2:00 p.m. – 3:00 p.m.** **How Do We Make Things Happen? Testimonials from Students**
How do we learn from the students how to implement their vision and experience for all students?
- **Students from Science Leadership Academy**, *Philadelphia, PA*
 - **Students from Future Scientists and Inventors**, *Israel*
 - Moderator: **Frederic Bertley**, *Vice-President, Science and Innovation, Franklin Institute; Founder of Science Leadership Academy*
- 3:00 p.m.** **Break**
- 3:15 p.m. – 4:00 p.m.** **Deep Dive: Facilitated Conversation in Small Groups**
We heard from many experts and innovators. How do we take the lessons learned from this conference and continue the discussion in Israel? How can private philanthropy be the driver?
- 4:00 p.m. – 4:30 p.m.** **Closing Keynote: Ada Yonath**, *Nobel Laureate in Chemistry*
Ada Yonath won the 2009 Nobel Prize in Chemistry for her work on the structure and function of the ribosome, and is director of the Helen and Milton A. Kimmelman Center for Biomolecular Structure and Assembly of the Weizmann Institute of Science
- 4:30 p.m. – 4:45 p.m.** **Next Steps: Where Do We Go From Here?**
- **Hubert Leven**, *President, Rashi Foundation*
 - **Andrés Spokoiny**, *President, Jewish Funders Network*

SUGGESTED PRE-MEETING **READING MATERIAL**

1. **“Attributes of STEM Education. The Student. The School. The Classroom.”**
By: Jan Morrison, *CEO of TIES*
2. **“Status of STEM Teaching In Israel and Its Effects On The Economy”**
By: Yoav Levy, *Development and Evaluation Unit of The Rashi Foundation*
3. **“Unprecedented Number of Test Results Thrown Out Due to Suspicions of Cheating.”** Haaretz
By Or Kashti | Oct. 16, 2012
4. **“Study by The Marker Finds That Subjects in Demand by Job Market Are In Short Supply at High Schools.”** Haaretz
By Lior Dattel | Aug. 27, 2012
5. **“Education Council Launches Campaign to Attract Minorities to Universities.”** Haaretz.
By Talila Neshet | Oct. 21, 2012
6. **Darca Schools – An Overview**
7. **Ahed School Progress Report**
Click here to download the report:
<http://www.jfunders.org/sites/default/files/docs/events/ahedschoolprogressreportoct2012.pdf>

ATTRIBUTES OF STEM EDUCATION: THE STUDENT, THE SCHOOL, THE CLASSROOM

Part of a STEM Briefing Series

By Jan Morrison

THE STUDENT

The hallmark of being a youngster is play, "...the experience of play is grounded in the concept of possibility." (Thorne, 1998) If the cognitive learning theorists are right, then play is the pre-cursor to problem solving. Questioning is central to play. Thus, children asking questions of the adult world is vital to their development. Children are handed verbal cues that keep them safe, "don't touch the stove." Yet, their world is full of stimulation that spurs them to questions, not just acceptance of commands. They "tinker" with notions as much as play dough and legos. "Why" is vital to their understanding. Slowly, over their early childhood they become more and more sophisticated problem-solvers, robust knowledge and understandings are socially constructed through talk, activity and interaction around meaningful problems and tools." (Vygotsky, 1978) Their need to understand the world and address their whys creates pathways for them to begin to make sense of the world, "Humans are viewed as goal-directed agents who actively seek information." ([How People Learn](#), Pg. 10) Thus, as an entering elementary student, they have solved many problems for themselves using a design model.

A K-12 STEM educated youngster would then continue their education in consonance with this view of the world. They would be invited to continue to understand process and apply their understanding to novel situations. Knowledge, facts and vocabulary would support their drive to understand and make sense of things.

SUGGESTED ATTRIBUTES OF THE STEM EDUCATED STUDENT:

- Problem-solvers – able to frame problems as puzzles and then able to apply understanding and learning to these novel situations (argument and evidence)
- Innovators – "power to pursue independent and original investigation" (Gilman, 1898) using the design process
- Inventors – recognize the needs of the world and creatively design and implement solutions
- Self-reliant – able to set own agendas, develop and gain self-confidence and work within time specified time frames
- Logical thinkers – using the logic offered by calculus and found in 60% of all professions world-wide; able to make the kinds of connections to affect an understanding of natural phenomena
- Technologically literate – understand the nature of the technology, master the skills needed and apply it appropriately (Knowledge, Ways of Thinking and Acting, and Capabilities as specified by ITEA in [Technically Speaking](#))
- Participants in the STEM lexicon that supports the bridge between STEM education in school and the workplace
- Able to relate their own culture and history to their education

THE SCHOOL

"For too long we have collapsed teaching in STEM to the presentation of information and cultivation of technique" and therefore student understanding has fallen short. (Rosenblatt, 2005). We have treated the material as sacred and paid little attention to the pedagogy that is key to quality instruction. Children learn through experience, talk and discourse. A student learns through shaping an argument and providing compelling evidence for it. On top of this narrowed view of STEM education, we have continued to perpetuate the great silos of biology, chemistry and physics, not as the natural phenomena present itself but as the Committee of Ten in the late 1800's viewed STEM education. "The Committee of Ten reduced the American education system to the pursuit of "knowledge" and the exercise of the mind in the cause of judgment." (Morrison, 2005) Therefore the challenge or charge for the STEM Academy is to, "construct a learning environment in which students have significant opportunities to take charge of their own learning; construct learning environments that are fundamentally oriented toward democratic

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ATTRIBUTES OF STEM EDUCATION: THE STUDENT, THE SCHOOL, THE CLASSROOM

Part of a STEM Briefing Series

continued

ideals – independent of the age of the learning—rather than the preparation of “obedient” bodies (Foucault, 1975).” (WM Roth, 1998). Furthermore, as the National Science Education Standards relate, “There should be less emphasis on activities that demonstrate and verify science content” and more emphasis on those “that investigate and analyze science questions” (NRC, 113).

The synthesis of these ideas leads to acknowledging teaching of STEM in the first place but, with design leading the way. Teaching science and mathematics through design, “formally engages students in this basic human approach to meeting life’s challenges and in the process addresses several longstanding issues in science education... (and math education).” (Haury, 2002) The design process offers a means of problem solving that is time-tested in engineering, technology and the arts. It compels students to understand the issues, distill the problems and understand processes that lead to solutions, “The major education goal in design is that students can develop two important kinds of knowledge necessary for making increasingly intelligent choices and decisions: (a) deep familiarity within a specific domain (content knowledge); and (b) strategies for bringing structure to complex and ill-defined problem settings invention and engineering.” (W.M. Roth, 1998) There is widespread consensus that engaging students in design is vital in science and mathematics education (AAAS, Project 2061, 1993) with studies demonstrating that design can significantly advance academic, creative abilities and cognitive function. (Hetland, 2000; Seeley, 1994; Willet, 1992). The design process offers a sophisticated means of instruction for the school and classroom.

What about the curriculum and materials? Science, technology, engineering and math (STEM) is a meta-discipline, the “creation of a discipline based on the integration of other disciplinary knowledge into a new ‘whole.’” This interdisciplinary bridging among discrete disciplines is now treated as an entity, STEM. It offers a chance for students to make sense of the world rather than learn isolated bits and pieces of phenomena. Yet, STEM is really greater than interdisciplinary. It is actually trans-disciplinary in that it offers a “multi-faceted whole” with greater complexities and new spheres of understanding that ensure the integration of disciplines. (Kaufman, et al. 2003, Abts, 2006)

SUGGESTED ATTRIBUTES OF THE STEM SCHOOL:

- STEM literacy as a priority for all students with all learning styles and backgrounds
 - STEM literacy as culturally relevant to all students and teachers
 - Design process driving the STEM instruction throughout the school
 - Designing is cognitive modeling in which a person gains insight into a problem, determines alternative pathways, and assesses the likelihood of success between solution sets
 - Designing is an intentional activity which can bring about change
 - Designing is intuitive and deductive, it is more than knowing how to use resources, or how to practice skill sets “through designing humans structure continuous experiences into a series of overlapping episodes... by focusing on designing and interpretive activity... construct meaning and knowledge.” (Roth, 1998, p.18; Abts MSP Pending 2006)
 - Tinkering with notions and materials central in all school areas, curricular and co-curricular
 - Curriculum materials in support of the instruction not to supplant it
 - All curriculum materials STEM in nature (trans-disciplinary)
 - Emphasis on technology and engineering in science and mathematics courses
 - Use of NSF generated mathematics and science materials with design embedded
- Broad range of STEM courses available to students throughout their high school career (ex.: animation with AAVID in the ninth grade, GIS throughout, etc.)

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ATTRIBUTES OF STEM EDUCATION: THE STUDENT, THE SCHOOL, THE CLASSROOM

Part of a STEM Briefing Series

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- Innovation and invention highly prized in all student engagement
- A culture of questioning, creativity and possibility pervading the school
- Rigor is defined using benchmarking of design process with student outcomes
- Testing of students formative and most often performance based
- Teachers having a “thorough understanding of the subject domain and the epistemology that guides the discipline (How People Learn, p. 188)
- All professional development for teachers yearlong would use classroom materials, integrate STEM across the curriculum and be constructivist in nature (Horizon Research NSF, 2006)
- Compliant in state testing and standards as the floor not the ceiling
- Administrative decisions data driven within the mission of the STEM Academy

THE CLASSROOM

Suggested attributes of the STEM classroom Grades 6-12:

- Active and student-centered
- Equipped to support spontaneous questioning as well as planned investigation
- Center for innovation and invention
- Classroom, laboratory and engineering lab are physically one
- Equipped with small hand tools, malleable materials and ventilation to specification
- Outfitted with computers (laptops) with STEM software: GIS, AAVID, CAD, etc.
- Supportive of teaching in multiple modalities
- Furniture is easily reconfigured
- Electricity is accessible from the ceiling and the floor
- Serves students with a variety of learning styles and disabilities

LINGERING ISSUES...

Although we are replete with reports delineating the issues in workforce and school, there is very little that specifies STEM education (attributes of graduates, schools, and classrooms). Few hold a vision for this kind of secondary school reform. Few understand the bridge between workforce and school. Finally, very few understand the needed professional development for pre-service and in-service teachers who will be STEM teachers shortly. Many decision-makers further the misconceptions about this kind of work when they speak to this issue.

Major misconceptions about STEM education...

- Technology and engineering are to be layered as additional coursework
- Technology means additional computers for schools and students
- Technology means word processing
- Hands-on means active learning with protocols
- STEM omits laboratory work and the scientific method

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ATTRIBUTES OF STEM EDUCATION: THE STUDENT, THE SCHOOL, THE CLASSROOM

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continued

- All STEM educated students will be forced to choose technical fields because they do not have a liberal arts foundation
- Mathematics education is apart from science education
- STEM addresses only workforce issues
- Technology education and engineering are disparate and troublesome
- Tech ed teachers cannot teach science or mathematics
- Engineers cannot teach science and math

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STATUS OF STEM TEACHING IN ISRAEL AND ITS EFFECTS ON THE ECONOMY

Written by: Yoav Levy, Development and Evaluation Unit of The Rashi Foundation

STEM TEACHING IN ISRAEL

Low achievements in international comparisons

In the “government status report” (Ben-David, 2010), the achievements of Israeli children were compared with pupils in 25 OECD countries since 1999. The report found that in four out of five international tests, which were administered between 1999-2007, the average level of achievement in Israel was below the achievements of all 25 OECD member countries.

In the last PISA (math and science literacy) test in 2009, Israeli achievements were 50 points lower (about half a standard deviation) than the average for OECD countries (496 in math and 501 in science). This statistic ranked Israel in 41st place in math and science from among 64 countries (National Authority of Measurement and Evaluation, 2009).

Continual decline in excellence

Of the 118,000 eligible 18-year-old pupils in 2009, only 62,000 took the math matriculation exam (52% of the age group), only 11,000 of whom, or 9.3% of the age group, took the 5-unit test in math and of these, only 6,600 (5.6%) received a grade above 85, in contrast with 13% on average in the OECD (Office of the Prime Minister report 2012).

The percentage of graduates eligible for a “quality technology-science matriculation diploma” (5 units math and two other enhanced science or technology subjects) was only 5% of all 12th graders (Rimon and Romanov 2012).

A retrospective analysis found that only 38% of students which earned an average score of 85 or more on the Meitzav exams (in 8th grade) went on to earn a quality science-technology matriculation diploma (Rimon and Romanov 2012).

In Israel, approximately 34% of pupils attend a technology education framework in contrast with an average 49% in the EU19 countries. Of those studying in technology tracks in Israel, only 55% study in a clear technology track such as communications systems, mechatronics, system design and programming (Office of the Prime Minister report 2012)

Shortages and Poor Quality of Teachers

The past decade has witnessed a significant decline in the number of pure science teachers, and this is reflected in a 40%-54% drop in most STEM subjects, resulting in a tremendous shortage in the teaching system (Ministry of Education 2012).

Only 22% of math teachers who are academicians under the age of 45 earned a Bachelors degree in math, in contrast with 42% who did not study math, math instruction or science at all. This statistic indicates relatively poor quality of teachers in the STEM disciplines (Ministry of Education 2012).

Drop in percentage of students choosing STEM disciplines

Over the past four years, the number of students choosing to study science and technology has declined while the number of pupils studying social sciences and business has risen. In Israel, only 25% of Bachelor degree graduates study the natural sciences and technology, in contrast with 30% in Western countries (Herzliya Conference, 2009). As of 2010, only 14% of university students studied the natural sciences and math and 14% studied engineering.

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STATUS OF STEM TEACHING IN ISRAEL AND ITS EFFECTS ON THE ECONOMY

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STEM TEACHING IN THE PERIPHERY

The gaps in national and international aptitude test achievements in STEM subjects between pupils from affluent towns and pupils in the periphery are extremely large. For example, on PISA tests 2006 in math and science for 10th graders, an 81-point gap was recorded (OECD average 500) in sciences and 91-point gap in math. In the 2008 Meitzav tests in the 5th grade on science and technology, the gap was 93 points (average 500) (Sabrisky and Buzaglo 2009).

Out of six international tests, which were administered between 1999-2009, the average gaps in achievements between groups and communities inside Israel are the largest among all 25 OECD leading members (Ben-David, 2011).

In Hebrew public education, the percentage of pupils studying pure sciences for matriculation is highest in the more affluent towns in comparison with the periphery (Physics: 24% vs. 13%, Chemistry 21% vs. 3%) (CBS 2012)

The more distant a town is from the center of the country, the lower the chances of high school to offer students STEM courses for matriculation. For example, physics is taught in about 88% of high schools in affluent towns but in only 59% of towns in the periphery. Chemistry matriculation is available in 57% of high schools in affluent towns but only in 29% of high schools in the periphery.

In Hebrew public education, in affluent towns, the average number of classroom hours in math was higher in comparison with towns in the periphery (5.4 hours vs. 5 hours). (CBS 2012).

IMPLICATIONS OF THE CRISIS IN STEM TEACHING ON THE ECONOMY

An Office of the Prime Minister report that examined the supply of personnel for the hi-tech professions found a shortage of skilled personnel, particularly on software sectors (computer science and computer engineering), electronic, and R&D sectors (Office of the Prime Minister 2012).

Whereas every year, an additional 7000 new jobs are added to the hi-tech sector, the number of high school graduates with satisfactory math skills (5 unit math matriculation exam with a score of 85 or more) is 6000 pupils a year, and the number of graduates in computer disciplines from universities and colleges is only 4500 a year (Office of the Prime Minister 2012).

THE WEIGHT OF THE HI-TECH INDUSTRY IN ISRAEL'S ECONOMY

The hi-tech industries generate \$28 billion dollars in exports in Israel a year, comprising 50% of all industrial exports (with the exception of diamonds).

The annual export growth rate of hi-tech industries on average stands at 12%, vs. the growth rate of 4% of other industrial export sectors (except diamonds).

The hi-tech industries' contribution to Israel's GNP is 12%, and 7% for the rest of the world.

10% of all employees in the market are employed in hi-tech companies (268,000 jobs).

The output of an engineer in the hi-tech industries in Israel is on average about \$1 million a year and for hi-tech employees on average \$100,000 a year.

The average salary of an employee in Israel's hi-tech sector is twice as high as the market average (NIS 16,000).

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STATUS OF STEM TEACHING IN ISRAEL AND ITS EFFECTS ON THE ECONOMY

continued

CURRENT STATUS OF ISRAEL'S HI-TECH INDUSTRY

In recent years, Israel's hi-tech sector has experienced a slowdown in terms of its share in the GNP and in terms of export, for the following reasons:

- **Insufficient training of professional and quality personnel** – demand for employees in the hi-tech sectors is significantly exceeding supply. Institutions of higher education in Israel are unable to train a sufficient amount of professional employees.
- **Maturation and exit of human capital from the job market** – in recent years, the number of hi-tech employees and engineers leaving the job market has increased, and particularly Russian engineers who immigrated to Israel in the 1990s.
- **Decline in the percentage of students in the sciences** – Over the past four years, the number of students choosing the science and technology professions has declined (they are considered “difficult” professions to study) while the number of students choosing the social sciences and business has increased.
- **Lack of programs to enhance human capital in weaker population sectors** – The percentage of hi-tech employees coming from weaker population sectors (Orthodox Jewish, Arab, periphery) is low. Apart from a small number of intervention programs to encourage employment in hi-tech, there is no source of growth in the foreseeable future.
- **Competition in the international arena** – Annual cost of an engineer in Israel is \$144,000 vs. \$36,000 in China and \$50,000 in India. Israel, in recent years, has lost about 10,000 engineering jobs as a result of relocation of R&D centers of multinational companies from Israel to Asia and the Far East.

HI-TECH INDUSTRIES IN THE PERIPHERY

The absolute majority of hi-tech companies in Israel are located in the center of the country, between Gadera and Hadera, resulting in large socioeconomic gaps between the center of the country and the outlying areas. Below are some statistics that illustrate this claim:

- Only 2.4% of venture capital investments in the past decade in Israel reached companies in the south.
- Only 2.3% of those employed in Israeli start-ups are located in the southern district.
- The salary of a hi-tech employee in the south is 15%-20% lower than the salary for employees in the same position in the center.
- 25% of hi-tech employees who lived in the south in 2001 had moved to live in the Tel Aviv area for their work by 2006.

EXCELLENCE IN ISRAEL

Listed below are statistics that indicate the achievements of Israel in science and technology in relation to the world:

- Israel is ranked first in the world in the number of start-up companies in relation to the number of citizens: 3850 companies – in other words, one company per 1844 residents.
- Israel is the second largest source of innovation in the world, after the US
- Investments in venture capital funds per capita in Israel was 2.5 times higher than in the US, 30 times higher than in Europe, 80 times higher than in China and 350 times higher than in India. The top venture capital funds in the world invest in Israel, including: Sequoia, Benchmark, Greylock, Intel Capital, Motorola Ventures, GA Capital, Morgan Stanley, Disney Ventures.

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STATUS OF STEM TEACHING IN ISRAEL AND ITS **EFFECTS ON THE ECONOMY**

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- Investment in civilian Research and Development (R&D) of the GNP in Israel was 4.8% in contrast with 2.4% average in the OECD and 2.2% invested by the US.
- Israel leads in the relative number of R&D employees, 140 per 10,000 citizens, vs. 85 in the US.
- Israel has the highest percentage of engineers and scientists in the population 135 per 10,000 residents. In the US (ranked second) this number is 85 and in Japan -75.
- The number of people with Ph.Ds. in the exact sciences in Israel is the highest in the world – 15 per 10,000 citizens.
- Only the US has more number of scientific publications than Israel.
- Annual sales of defense industries in Israel is \$8.5 billion a year, placing Israel in third place in the world.
- Israel is one of nine countries in the space club
- Over 400 global giants operate in Israel, such as Intel (7000 employees in 6 factories and \$1.5 billion in exports), Motorola (over 3000 employees and \$1 billion in sales), IBM (over 2000 employees and the second largest R&D center in the world), Microsoft, HP, Texas Instruments, Cisco, Google, AOL, Siemens, Phillips...
- Israeli companies are acquired by global corporations but remain in Israel due to the quality personnel. For example, IBM, Kodak, HP, AOL, Warren Buffet, Siemens, Johnson & Johnson.

ISRAELI EIGHTH-GRADERS' MATH SCORES PLUMMET

Unprecedented number of test results thrown out due to suspicions of cheating.

By Or Kashti | Oct. 16, 2012

Eighth-graders scored significantly worse this year on the math section of the most recent Meitzav exam, a national achievement test, than they did the year before. The Education Ministry is now trying to determine whether the decline stems from a new math curriculum instituted in middle schools.

According to data released by the ministry on Monday, the average eighth-grade math score for the 2011-12 academic year was only 501 points on a scale ranging from 200 to 800, down from 522 points the previous year. The decline affected both Jewish and Arab students, though it was slightly greater among the latter.

Eighth-grade scores also fell in three other subjects tested on the exam - English, Hebrew and science (though the drop in the latter was smaller). The only subject where eighth-graders showed an improvement was Arabic, which Arab students are tested on instead of Hebrew.

In contrast to the eighth graders, fifth graders improved their Meitzav scores in both English and Hebrew, while their math and science scores stayed roughly constant. The fifth-grade exam in Arabic was invalidated, for the first time since the tests were instituted, because the National Authority for Measurement and Evaluation, which administers the exams, suspected widespread cheating.

Overall, fifth-grade scores have improved steadily over the last four years in all four Meitzav subjects - math, science, English and mother tongue (Hebrew or Arabic). That had been true of eighth graders as well until the latest test.

Some 113,150 fifth-grade and eighth-grade students took the Meitzav last year. But the authority disqualified the results from 213 classes in Arab schools - about 10 percent of all participating Arab classes - and five classes from Jewish schools, so these students were not included in the final results.

At a press conference in Jerusalem on Monday, Education Minister Gideon Sa'ar voiced concern over the widespread cheating. "The number of classes that were disqualified is unprecedented," he said. "Our assumption is that in the past, too, there have been cases of [grade] inflation that weren't discovered. This is self-deception, and we won't accept it. Every incident of cheating will be handled with the utmost severity."

Ministry officials noted that disciplinary action has been instituted against two principals whose schools were the scene of a significant amount of cheating.

Overall, average scores not only continued to be higher in Jewish schools than Arab ones, but the gap actually widened for both fifth and eighth graders in all three subjects where comparison is possible (English, math and science). For instance, the gap rose to 46 points in eighth-grade math, up from 36 in the 2010-2011 school year; to 63 points in eighth-grade English, up from 46; and to 43 points in fifth-grade science, up from only 18.

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ISRAELI EIGHTH-GRADERS' MATH SCORES PLUMMET

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Large gaps also persisted between students from different socioeconomic backgrounds, though in this case they were slightly narrower than in 2010-2011. Among fifth graders, the gap between well-off and needy students stood at 46 points in English, 49 in science, 51 in Hebrew and 57 in math. And the gaps were much higher among eighth graders: 73 points in Hebrew, 80 in English, 84 in math and 87 in science.

The Meitzav also includes a questionnaire relating to the school environment, which is filled out by all students in grades five through 11. The results show that 77 percent of elementary school students, 70 percent of middle school students and 68 percent of high school students said they were happy at school and had no desire to transfer to a different institution.

However, only 41 percent of high school students described teacher-student relations as being close and caring.

As for violence, about 10 percent of students overall reported having been involved in a violent incident in the month before the survey. Over the last four years, the percentage has declined slightly at elementary schools, but there has been no clear movement in either direction at middle schools and high schools.

Contrary to popular opinion, however, the highest rate of violence is still reported at elementary schools, whereas high school students report the lowest rate.

FEWER SCIENCE CLASSES OFFERED TO POOR STUDENTS IN ISRAEL'S OUTLYING AREAS

Study by The Marker finds that subjects in demand by job market are in short supply at high schools.

By Lior Dattel | Aug. 27, 2012

A large proportion of Israeli high schools do not offer matriculation in science and technology, the kind of subjects that lead to places in universities and the best-paying jobs, a study by The Marker has found.

The students who suffer the shortfall the most are those who live in outlying parts of the country and in poorer communities, found the study, published as the school year starts for most of the country's schools today.

As a result, the opportunity for students to graduate high school with an emphasis in either science or technology is largely a function of how close they live to the center and their community's standard of living.

Physics, for example, is offered by 68% of high schools in Israel - 88% of those in wealthy communities in the center, and only 59% of those in what the Education Ministry has termed socioeconomically disadvantaged areas in the periphery, according to the Central Bureau of Statistics.

About 86% of schools in wealthy central areas offer biology, as compared to 48% of schools in poor, outlying areas.

Chemistry - the so-called "endangered profession" - is offered as a matriculation option in just 400 of the country's 1,020 high schools. Of those, 57% are in rich neighborhoods; 29% are located in areas

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FEWER SCIENCE CLASSES OFFERED TO POOR STUDENTS IN ISRAEL'S OUTLYING AREAS

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deemed socioeconomically disadvantaged. Many of the schools that do offer chemistry do so only as part of the biology matriculation requirements.

It's no wonder only 800 chemistry teachers remain in the system, most of them on a part-time basis and 50% approaching retirement.

The figures improve somewhat if ultra-Orthodox educational institutions that choose not to offer science classes aren't factored in, and if facilities for dropouts and at-risk youth are disregarded as well. But even then, a full 15% of Israel's academic high schools don't offer any of the technology or science courses at the maximum five-unit matriculation level, and 35% don't offer chemistry at all.

High schools in the poor, outlying areas tend to concentrate on the core matriculation subjects: math, Hebrew, English, history, literature, Bible and civics. A much wider range of courses is available in central cities and towns - not only in science and technology, but in humanities and social sciences as well.

Fewer teachers

About 35% of wealthy school zones offer the courses required for students to graduate in communication technology, compared with 21% in poor communities. In psychology, it's 46% compared to 29%; sociology, 47% versus 29%; and philosophy, 10% versus none at all. The trend applies to enrichment studies as well: music, 49% versus 27%; arts, 68% versus 59%; and television and film, 12% versus 7%.

One reason for the lack of science and technology classes is a sharp 40% to 54% drop in the number of teachers in most of these subjects during the past decade. Meanwhile, those who remain tend to prefer working close to home - usually in the center. Wealthier local authorities also have better resources and conditions, beyond the limited budgetary allocations from the Education Ministry, and are therefore able to better compete for teachers.

Last year the ministry suggested offering teachers large raises - up to 75% more - to teach in the periphery, but the effort hasn't yet made much headway.

There is also the problem of sheer numbers: The ministry provides full funding for classes averaging 36 students, which is less challenging to attain in large centrally located schools than in smaller outlying institutions with overall enrollments of 200 to 300 students.

"Even if you have a chemistry teacher and manage to come up with a class of 15 students, you'll still suffer a loss," explains Dr. Arie Locker, head of the principals association. "That's why many high schools stopped teaching chemistry and physics. If a principal can't maintain an economically stable system, then he hasn't any choice."

Sometimes the lack of science and technology seemingly works out to the benefit of the students, principals and the Education Ministry - but only in the short term. As Ran Erez, head of the secondary school teachers association, explains: "The students tend to prefer easier courses because science classes are harder to pass, and principals choose to avoid focusing on hard subjects to raise their percentage of matriculating students and the school's average. This is the result of the ministry placing matriculation rates above everything else."

ISRAEL TO LAUNCH CAMPAIGN TO ATTRACT MORE ARAB STUDENTS TO UNIVERSITIES

EDUCATION COUNCIL LAUNCHES CAMPAIGN TO ATTRACT MINORITIES TO UNIVERSITIES

By Talila Nesher | Oct. 21, 2012

As Israel's 2012-13 university academic year begins on Sunday, substantial and persistent gaps remain between Jews and Arabs when it comes to pursuing higher education. An internal Council for Higher Education report obtained by Haaretz shows that only around 11 percent of undergraduate students are Arabs.

The education council document is the result of its own comprehensive study, surveying all those involved in the process of accessing higher education - from high school through the senior faculty at institutions of higher learning.

The document was formulated in preparation for a wide-ranging NIS 300 million plan that the council is launching to make higher education more accessible to minorities. The details are being presented here for the first time.

According to the report, Arabs are disadvantaged from the start: While 44 percent of Jewish students meet the minimum requirements for university acceptance, only 22 percent of Arabs do.

Even those who do meet the requirements are less likely to get in: 32 percent of Arabs who apply to institutions of higher education are not accepted, compared to 19 percent of Jews.

Among the main obstacles cited in the report are "the products of the formal educational system." For example, only 57 percent of Arab teens take the matriculation (bagrut) exams, compared to 75 percent of Jewish teens. Also, only half of the Arabs who sit for the exams obtain a matriculation certificate (28 percent of all Arab pupils), while around two-thirds of the Jews (51 percent of all Jewish pupils) earn one.

Another obstacle is the psychometric test, a primary entrance requirement for university acceptance, on which Arabs, on average, score about 100 points lower than Jews. The biggest gaps are in the English scores and this, the report states, is because "English for them [the Arab pupils] is a fourth language (after spoken Arabic, literary Arabic and Hebrew)."

The report, however, also paints a depressing picture for those Arabs who manage to work their way into academia, pointing to sharp drops in equality of opportunity the higher Arab students try to advance.

While Arabs constitute 11.3 percent of undergraduate students, they only comprise 7 percent of master's degree students and 3 percent of doctoral students. Arabs, moreover, make up only 2 percent of the academic faculty.

The document also indicates that many Arab students drop out before earning an undergraduate degree. Arabs make up only 9 percent of those actually earning bachelor's degrees. In the academic year 2009-10, 15.4 percent of Arab students dropped out, compared to only 10.8 percent of Jewish students, the report says.

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ISRAEL TO LAUNCH CAMPAIGN TO ATTRACT MORE ARAB STUDENTS TO UNIVERSITIES

continued

More Arab students than Jews take longer than the standard three years to complete their degrees. While 53 percent of Jews earn their bachelor's degrees in three years, only 36 percent of Arabs do.

The survey also examined where Arab students obtained their degrees. Only 11.5 percent attended universities, while 24.5 percent were in teacher-training colleges. Arabs make up more than 30 percent of the students at the University of Haifa, but comprise less than 12 percent of the student body at the Hebrew University of Jerusalem; less than 9 percent at Tel Aviv University; a little over 5 percent at Ben-Gurion University of the Negev, Be'er Sheva; and less than 3 percent at Bar-Ilan University, Ramat Gan.

In an effort to improve the inclusion of minority students, the CHE's NIS 300 million campaign - available from now until 2016 - will allow each institution to offer a basket of support services to Arab students, such as counseling and personal support.

In return, the CHE is also making demands of the institutions. For example, during the coming year they will also have to translate their websites into Arabic; this will be a condition for continued funding. And starting next summer, all institutions will have to offer minority students a workshop to help them improve their Hebrew and their study skills, and offer them general academic orientation. These workshops will be subsidized by the CHE and must begin two months before the start of the academic year.

All institutions will be asked to prepare a long-term plan with clear goals for accepting minorities, varying their fields of study, encouraging them to pursue advanced degrees, reducing dropouts and reducing the dragging out of degrees. CHE funding for minority students will be contingent on this plan.

During this academic year, information centers will start to open in Arab towns and cities, with 25 such centers to open by 2016. In each community, a coordinator will supply information about academic institutions and fields of study to high school students, offer them pre-academic workshops and provide scholarship information. These coordinators will be supervised by a steering committee made up of public figures and academics, most from minority communities.



The driving idea behind the founding of this network was to strengthen the schools in Israel's geo-social periphery and support them on their way to becoming high quality institutions of post-primary education. The Darca network caters to Israel's highly diverse communities, with the aim of strengthening the country's social fabric.

Darca is a network of high schools established by the Rashi Foundation in partnership with Alliance-KIAH. Darca enjoys the support of the Ministry of Education and has an advisory public council comprising leading educators, intellectuals and social activists from among the top echelons of Israeli society.

Darca has been operating since the 2011-2012 school year. It currently operates in seventeen schools throughout Israel's north, center and south regions. Darca combines quality education with advanced educational methods, a learning environment that encourages curiosity and exploration, and educational work based on imparting social values of leadership and responsibility to the community.

The network aspires to excellence in pedagogy and education, to promoting values and nurturing a positive school atmosphere.

The pedagogical aims include the desire to educate students to meaningful learning and encourage them to grow into creative, thinking individuals with a thirst for knowledge. In terms of social values education, emphasis is upon social involvement, an affinity with the State of Israel, good citizenship, the values of democracy; and enhancing Jewish-Israeli identity.

To achieve these goals, we put to the best possible use the resources of knowledge and professionalism of the Ministry of Education, with the support of additional bodies.

Among its other efforts, the Darca network runs Rashi Foundation's tried and true intervention programs in the fields of social welfare, educational enrichment programs, accessibility of higher education, and Alliance-KIAH programs on Jewish identity.

SPEAKER BIOS

Asaf Banner

Teach First Israel

Asaf Banner is the CEO for Teach First Israel, an Israeli program modeled on the Teach for America initiative. He is also a partner in establishing and managing various associations, including The Good Neighbor, which uses economies of scale to aid in food distribution throughout Israel. Asaf was the CEO and co-founder of the B'maagaley Tzedek association, which established the Tav Chevrati—a seal of approval granted to businesses that respect the legally mandated rights of their employees and are accessible to people with disabilities. Asaf is also a co-founder of Psifas Fund which offers significant financial aid to help Israeli citizens in need take the first step towards improving their lives. In 2009, Asaf was named Social Entrepreneur of the Year by Ernst & Young.

Yariv Bash

Founder/CEO, SpacEL

Yariv Bash is the CEO and Co-Founder of SpacEL—the Israeli team competing in the Google Lunar X-Prize: a privately funded, unmanned race to the moon, competing for a \$30 million prize established by Google. SpacEL's goal is to make Israel the third country to successfully land on the moon (after the U.S. and an unmanned Soviet mission). SpacEL is aimed at inspiring the young generation in Israel and abroad by creating interest in space and science. SpacEL is registered as an Israeli non-profit, and is committed to donating all prize money to promote education and science. Yariv is an electronics and computer engineer. In his spare time, Yariv organizes and participates in technological creativity events in Israel and around the world.

Liat (Taiber) Ben David

CEO Wolf Foundation, Israel

In 2011, Liat (Taiber) Ben David was appointed Director General of The Wolf Foundation, an Israeli foundation dedicated to promoting excellence in Sciences and Arts for the benefit of mankind. Among other activities, The Wolf Foundation awards the international Wolf Prize, which recognizes excellent scientists and artists worldwide. Liat was previously the head of Israel's National Science, Technology and Society (STS) Education Program for Secondary Schools at Tel Aviv University, where she developed and implemented the national curriculum, unique models for STS education and teacher training, and STS education books for teachers and students. Liat has served as Director General of the Jewish Agency's Israel Department and was the founding director of Maydah—the Ashalim National Knowledge and Learning Centre for JDC. Liat has published more than 21 education books for teachers and students, numerous articles, children's books, and a novel in Hebrew and English.

Barak Ben-Eliezer

Founder/ CEO Winnovation

Barak Ben-Eliezer is the co-founder and managing partner of Winnovation, a private fund investing in start-ups. He is a former commander of Talpiot Program. He is a co-founder of the President's Program for Nurturing the State of Israel's Future Scientists and Inventors, founder of the Einstein Network – a global network for the future of mankind – and was a special advisor in the fields of strategy and technology to the Police Commissioner and to the National Security Council.

Gila Ben-Har

CEO, Center for Educational Technology in Israel

Gila Ben-Har has been the CEO of the Center for Educational Technology for the past nine years. CET, a non-profit organization, has been working to promote education in Israel over the past four decades, and is the leading player in the development and introduction of both printed and digital content for teaching, learning and assessment. In her previous position, Gila was head of the Education, Culture and Sport Administration in the Municipality of Tel Aviv-Jaffa. She is a member of the first graduating class at the Mandel School for Educational Leadership in Jerusalem.

SPEAKER BIOS *continued*

Frederic Bertley

Vice-President, Science and Innovation, The Franklin Institute; Founder of Science Leadership Academy

Frederic Bertley, in his role at The Franklin Institute, oversees research-based projects as well as program development and implementation on gender equity in science, K-12 professional development, community outreach, and web-based educational resources. Additionally, he directs the prestigious Franklin Awards Program and is the Executive Editor of the *Journal of The Franklin Institute*. Frederic manages the Institute's partnership with The Science Leadership Academy, a public magnet school dedicated to project-based science and technology learning, as well as its PACTS after-school science and engineering program for urban youth. Frederic's team is part of a National Science Foundation-funded collaborative effort responsible for the design of a new learning platform for interactive exhibitry, integrating dynamic images and simulations with the traditional visitor experience. Additionally, through the NSF-funded LEAP into Science program, Frederic's group has partnered with the Free Library of Philadelphia to create a nationally replicable model museum/library partnership to promote family and after-school student engagement and achievement in science through literacy. The Franklin Institute Awards Program recognizes the most luminary scientists, and hosts events including a week of science education programming for the lay and scientific communities in Pennsylvania. Prior to joining the Institute's leadership team, Frederic was research scientist at Harvard Medical School, researching HIV/AIDS vaccines.

Michele Cahill

Vice President, Carnegie Corporation of New York

Michele Cahill is vice-president for national program and director of urban education at Carnegie Corporation of New York, where she leads the Corporation's strategy to meet the twin goals of contributing to societal efforts to create pathways to educational and economic opportunity by generating systemic change across a K-16 continuum, and to create pathways to citizenship, civil participation and civic integration in a pluralistic society. Michele was responsible for the establishment of Schools for a New Society, the Corporation's seven-city urban school reform experiment, and the New Century High Schools, a partnership with the Bill & Melinda Gates Foundation, the Open Society Institute and New Visions for Public Schools. Prior to rejoining Carnegie Corporation she was senior counselor to the chancellor for education policy in the New York City Department of Education and a member of the Children First senior leadership team that oversaw and implemented the full-scale reorganization and reform of the New York City public schools.

Mindy Feldbaum

CEO, The Collaboratory / Former Director for Workforce Development Programs, Academy for Educational Development, US Department of Labor

Mindy Feldbaum is the CEO of The Collaboratory which provides consulting services on issues of workforce development and education programs. Prior to her consulting work she served as the Senior Director of Workforce Development Programs at The Academy for Educational Development (AED), which worked on education and workforce development strategies and initiatives, including program design, implementation, policy, and evaluation. At AED, she worked on a variety of workforce development and education issues including leading the organization's efforts in green workforce and economic development. Mindy has worked on numerous green workforce development projects, including partnering on the Gates-funded project, Green Pathways to Postsecondary Success. Mindy has also served as the Program Manager for several major discretionary grant programs at the Department of Labor's Employment and Training Administration, and served as the Director of Workforce Programs at the U.S. Conference of Mayors.

SPEAKER BIOS *continued*

Eli Hurvitz

Executive Director, Trump Foundation, Israel

Eli Hurvitz serves as the Executive Director of the Trump Foundation, a philanthropic foundation which aims to serve as a catalyst for educational improvement in Israel by cultivating high-quality instruction of mathematics and the sciences in secondary schools. Eli was among the founders of Avney Rosha, the Israel Institute for School Leadership, and of the Nachshon project, which provides online tutoring for high school students nationwide. He is currently a director of Hemda, a science-teaching center in Tel Aviv, and of Hakol Hinuch, a public movement which advocates strengthening public education in Israel. Prior to that, Eli coordinated the Committee for Changing the Status of the National Library, was among the founders of the Guidestar project in Israel and served as the Deputy Director of Yad Hanadiv, a philanthropic foundation of the Rothschild Family in Israel.

Suzanne Immerman

Director of Strategic Partnerships, U.S. Department of Education

Suzanne Immerman serves as the Director of Strategic Partnerships for the U.S. Department of Education and is a Senior Advisor to Secretary of Education Arne Duncan. In this role, she leads the Department's private sector collaboration, encouraging and facilitating alignment, coordination and partnerships between the philanthropic and business community and the Department of Education's cradle-to-career reform agenda. Suzanne brings to this work over 15 years of experience in the independent sector, spanning corporate, private and family philanthropy as well as nonprofit program development in education. She served as the deputy director of the September 11th Fund, a \$530 million national foundation established in response to the terrorist attacks, and was director of the Wolfensohn Family Foundation, established by former World Bank President James Wolfensohn. She also served as Senior Consultant to the Verizon Foundation on its education portfolio, and was Manager of Public Affairs for NBC, overseeing the network's national corporate philanthropy. She cut her teeth in public-private partnerships at PENCIL, running New York City's Principal For A Day Program, created to inspire private sector support for public education.

Hubert Leven

President, Rashi Foundation

Hubert Leven has served as president of the Rashi Foundation since its founding in 1984, continuing a family tradition of philanthropy stretching back to his great-grandfather, one of the initiators of the Alliance Israélite Universelle network. After high school in France and the United States, Hubert gained a physics degree in America. From 1962 – 1999, he directed his brokerage firm in Paris, served on the executive committee of Source Perrier and led a number of its subsidiaries. Among his public position, Hubert serves as executive vice-president of Kol Israel Haverim and as vice-president and treasurer of the AIU School in Paris. He has been awarded honorary doctorates from Ben-Gurion University and the Technion.

Arthur Levine

President, Woodrow Wilson Foundation

Arthur Levine is the sixth president of the Woodrow Wilson Foundation. Prior to joining the Foundation, Arthur was president and professor of education at Teachers College, Columbia University and also served as chair of the higher education program at the Institute for Educational Management, and was senior lecturer at the Harvard Graduate School of Education. Arthur is the author of dozens of articles and reviews, including a series of reports for the Education Schools Project on the preparation of school leaders, teachers, and education researchers. His most recent book is *Generation on a Tightrope: A Portrait of Today's College Student*. Arthur has received numerous honors, including Carnegie, Guggenheim, and Rockefeller Fellowships as well as the American Council on Education's Book of the Year award. He is a member of the American Academy of Arts and Sciences and currently sits on the board of the Educational Testing Service and Say-Yes to Education.

SPEAKER BIOS *continued*

Talia Milgrom-Elcott

Program Officer, Senior Manager STEM Teacher Initiatives, Carnegie Corporation of NY

Talia Milgrom-Elcott is a Program Officer in Urban Education and the Senior Manager of STEM Teacher Initiatives at Carnegie Corporation of New York. She worked at the New York City Department of Education as the Project Director of System Transformation, where she supported and helped to implement system-wide reform efforts, including the creation of over 300 Empowerment Schools and the redesign of student support services. Prior to that, Talia clerked for Judge Robert Sack of the Second Circuit Federal Court of Appeals and was the first Workers' Rights Fellow at New York Jobs with Justice.

Jan Morrison

*CEO, Teaching Institute for Excellence in Stem (TIES)
Executive Director, Envision Excellence in STEM*

Jan Morrison has served as senior consultant for college-ready STEM education and for post-secondary success for the Bill and Melinda Gates Foundation, Battelle Memorial Institute, Carnegie Corporation of New York, Innovate to Educate, and the S.D. Bechtel, Jr. Foundation. Jan was Senior STEM Education Consultant for the Ohio STEM Learning Network, and serves as an advisor with the White House's Office of Science and Technology Policy and the Department of Education. Currently, Jan and TIES serve as the designer for the STEM Funders Network, a collaboration of more than nineteen STEM funders in the U.S. Jan consults with Chevron, NASA, Clinton Global Initiative, universities and state governments, among many others, who seek to create statewide STEM networks. Much of Jan's work focuses on the Learn and Earn space that offers students the opportunity to work in STEM fields while earning college credits. TIES provides technical assistance to the Healthcare Core Curriculum Consortia of community colleges funded by the Department of Labor, which focuses on STEM education relating to careers in the health care fields.

Samuel Pinto

President, Alliance-Kol Israel Haverim (KIAH)

Samuel Pinto has been President of Alliance-Kol Israel Haverim (KIAH) in Israel since November 2011. He is a businessman and an investment manager who served for the past 28 years at the Edmond de Rothschild Group. Sam is continuously involved in social matters promoting education and social change in Israel and sits on a few NGO boards of directors. In 2009, he made aliyah to Israel with his family from France and dedicates himself mainly to philanthropy.

Ofer Rimon

Head of Science and Technology Division, Ministry of Education, Israel

Ofer Rimon is the head of the Science and Technology Division of Israel's Ministry of Education. He previously served as director of the Development and Evaluation Unit at the Rashi Foundation, lectured at Sapir College's School for Public Policy and at Levinsky College, and worked as an Inspector at the Ministry of Education. He received the Outstanding Employee award at the Ministry of Education.

Richard Rosen

STEM Fellow at Johns Hopkins University & Practice Group Leader, TIES, STEM Education Systems Design

Rich Rosen's work focuses on education as a complete system with solutions that work across the boundaries of public policy, practice, and multi-jurisdictional partnerships. Prior to joining TIES, Rich spent 30 years with the global research and development organization Battelle where he was corporate vice president responsible for philanthropy operations including awarding grants totalling over \$100 million, much of it directed to STEM education programs. During his tenure he intensified Battelle's work in education outreach, founded Battelle's Education Operations, was founding Executive Director of the Ohio STEM Learning Network, and led Battelle's efforts to assist several states in the STEM portions of their successful U.S. Department of Education Race to the Top bids.

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SPEAKER BIOS *continued*

He is a member of numerous national and state STEM education groups has received the Distinguished Service Medal from The Ohio State University Board of Trustees, and was recognized by the National Society of Black Engineers for his work to increase opportunities in science, technology, engineering, and math among young minority students.

Larry Rosenstock

Principal, High Tech High, San Diego, CA

Larry Rosenstock is CEO and founding principal of High Tech High, a network of eleven K-12 public charter schools in California, and is dean of the High Tech High Graduate School of Education. Larry taught carpentry in urban high schools in Boston and Cambridge and was principal of the Rindge School of Technical Arts, and of the Cambridge Rindge and Latin School. A member of the Massachusetts and U.S. Supreme Court Bars, he served as an attorney at the Harvard Center for Law and Education, and was a lecturer at the Harvard Graduate School of Education. He directed the federal New Urban High School Project, and was president of the Price Charitable Fund. Larry is a winner of the Ford Foundation Innovations in State and Local Government Award, an Ashoka Fellow, and a winner of the McGraw Prize in Education.

Stephen D. Shapiro

Chair, International Advisory Committee of the Ahed High School for Science, Negev Bedouin / Board Member, UJA Federation of NY

Stephen D. Shapiro held a Leading Professorship and served as the chair of the department of Electrical and Computer Engineering at Stony Brook University. He was a member of the International Board of Governors and Academic/Scientific Committee of the Technion, is a Technion Honorary Fellow and served as President of the NY Region of American Technion Society. He chairs the International Advisory Committee of the Ahed High School for Science, an Excellence School, which is administered at all levels by members of the Negev Bedouin Arab community. He has been actively engaged with matters regarding Arabs in Israel for many years. Stephen is an investor and has held operating positions in various companies.

Gerald Solomon

Executive Director, Samueli Foundation

Gerald R. Solomon has served as Executive Director of the Samueli Foundation since 2008. Prior to the Samueli Foundation, Gerald served as CEO of Public Health Foundation Enterprises (PHFE), where he transformed the organization from operating the nation's largest WIC network in Los Angeles to becoming a national provider of public health services and funding, operating in 31 states with 1,600 employees and an annual budget exceeding \$120 million. During his tenure at Samueli, the Foundation has been changed from a responsive model to initiative-based grantmaking, with a focus on initiatives addressing systemic safety net needs in the areas of STEM education within the K-16 continuum, as well as funding collaboratives in community health. Gerald currently serves as co-chair of the National STEM Funders Network, and chairs the OC STEM Initiative and the Orange County Jewish Federation Rose Project.

Andrés Spokoiny

President, Jewish Funders Network

Andrés Spokoiny is a long-time Jewish communal leader with a history of leading successful organizational transformations. The CEO of Federation CJA in Montréal from 2009–2011, he helped fundamentally change the Federation's operations and its relationship with the community. As a young, 'out of the box' Federation executive, he spearheaded a new branding strategy and initiated and developed innovative community programs that are now being used as models across North America. Before joining the Federation, Andres worked for the American Jewish Joint Distribution Community (JDC) in Paris. As Regional Director for Northeast Europe, he was responsible for a number of pan-European projects, leading programs in the areas of Welfare, Leadership Development, Jewish Renewal, Education, Community Development, and Outreach, and building coalitions with local and international organizations, public and private.

Students From Israel's Future Scientists and Inventors and Philadelphia's Science Leadership Academy

Abed Kadri is a 14 year-old from Tira, and is part of the fourth class of the Future Scientists and Inventors Program. Abed successfully completed the preparatory summer program and is now starting the academic physics track of the program. Thanks to his high motivation, despite the many obstacles he succeeded in getting accepted to one of the best classes in one of the most prestigious schools in Israel's center.

Amit Levin is a 15-year-old from Ein Vered, and is part of the third class of the Future Scientists and Inventors Program. Amit successfully completed two academic courses in physics during his first year in the program. In addition, he represents the program in SpacEL, where he is part of a group working on the identification of an exact spacecraft landing point on the moon. He has participated in several conferences at Tel Aviv University and in other venues.

Taahir Henry, a 17-year-old from Philadelphia, attends Science Leadership Academy. Taahir has successfully completed a year of physics at SLA and is currently enrolled in a computer science course, focusing on an introduction in coding with the computer language Processing. During his junior high school year, he volunteered to work in the Academy of Natural Science, for an independent learning program. Taahir is currently working on a project that utilizes Processing and will eventually incorporate Java. He plans to major in computer/mechanical engineering.

Michelle Torelli, a 17-year-old from Philadelphia, attends Science Leadership Academy. For her individual learning program, Michelle has worked for two years in her school's tech lab, fixing hardware, replacing parts, and coding software. She speaks English and Spanish fluently and wants to become a chemical engineer who works internationally. Through Engineering Club she has chosen her senior project to be creating biodegradable plastics so as to create a biodegradable water bottle. Michelle has also won the Youth Appreciation Award given by the *South Philadelphia Review*.

Kathleen Traphagen

Informal STEM Consultant for Private Philanthropies

Kathleen Traphagen specializes in helping foundations, non-profits and government agencies build capacity with a focus on managing networks and collaborations, facilitating problem-solving, goal-setting and strategic planning with diverse groups. Her areas of expertise include school-community partnerships, youth development, early literacy and language development, and out-of-school time and expanded learning opportunities programming and policy. Kathleen currently manages three networks of grantmakers: the Grantmakers for Education Out-of-School Time Funder Network, Boston Education Funders, and the Funder Collaborative for Reading Success. Previously Kathleen was executive director of Boston's 2:00-to-6:00 After-School Initiative, where she led the effort to bring together the city government, the public schools, the philanthropic and corporate sectors, and cultural and community-based organizations to expand and improve out-of-school time programming for Boston's young people. Kathleen was also an intergovernmental policy analyst for Mayor Thomas M. Menino, and a planner for Action for Boston Community Development. Kathleen has published numerous papers and managed the Citizen Commission on Academic Success for Boston Children project that resulted in the report, *Transforming the Boston Public Schools: A Roadmap for the New Superintendent*.

Itzik Turgeman

Executive Vice President and Director General, Rashi Foundation, Israel

Itzik Turgeman joined Rashi in 2008 after a long and acclaimed career in the Israel Defense Forces, where he founded and directed the Atidim program that identifies high-potential students from the periphery and accompanies them through the army, academic studies and employment. As an electronic engineer, he previously served as assistant department head for electronics and head of production technology administration in the IDF. Itzik received the Israel Security Award in 1988 and the Head of IDF Intelligence Prize for Creative Thinking in 1999. In 2003 he was awarded an honorary fellowship from the Technion.

SPEAKER BIOS *continued*

Ada Yonath

Nobel Laureate and Professor at the Weizmann Institute

Born in Jerusalem, Ada Yonath studied at the Hebrew University, earned Ph.D. degree from Weizmann Institute of Science and completed her postdoctoral studies at Carnegie Mellon University and MIT. In the 70's she established the first laboratory for protein crystallography in Israel, which was the only laboratory of this kind in the country for almost a decade. She is now the Kimmel Professor of Structural Biology and Director of the Kimmelman Center for Biomolecular Structure and Assembly at Weizmann. In 2009 she was awarded the Nobel Prize for chemistry for studies of the structure and function of the ribosome. Owing to their fundamental significance for life, ribosomes are targeted by many antibiotics; Ada's work investigates the antibiotics' action alongside mechanisms acquiring antibiotics resistance to reveal paths for structure-based drug improvements. She holds honorary doctorates from universities around the world, and received the first European Crystallography Prize, the Israel Prize, the Paul Karrer Gold Medal, the Israel EMET award, the Rothschild Prize, the UNESCO Award for Women in Science, Albert Einstein World Award for Excellence, Erice Peace Prize, the Indian Prime Minister's Gold medal, and many others.

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