Lexington's Colonial Times Magazine

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Lexington's monthly feature publication

Lexington group brings Nobel Laureates to area high schools

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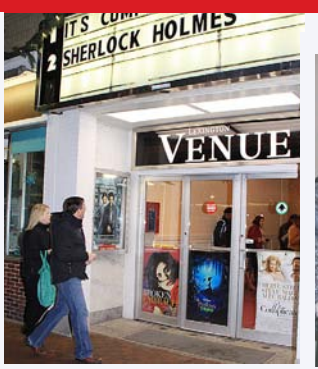

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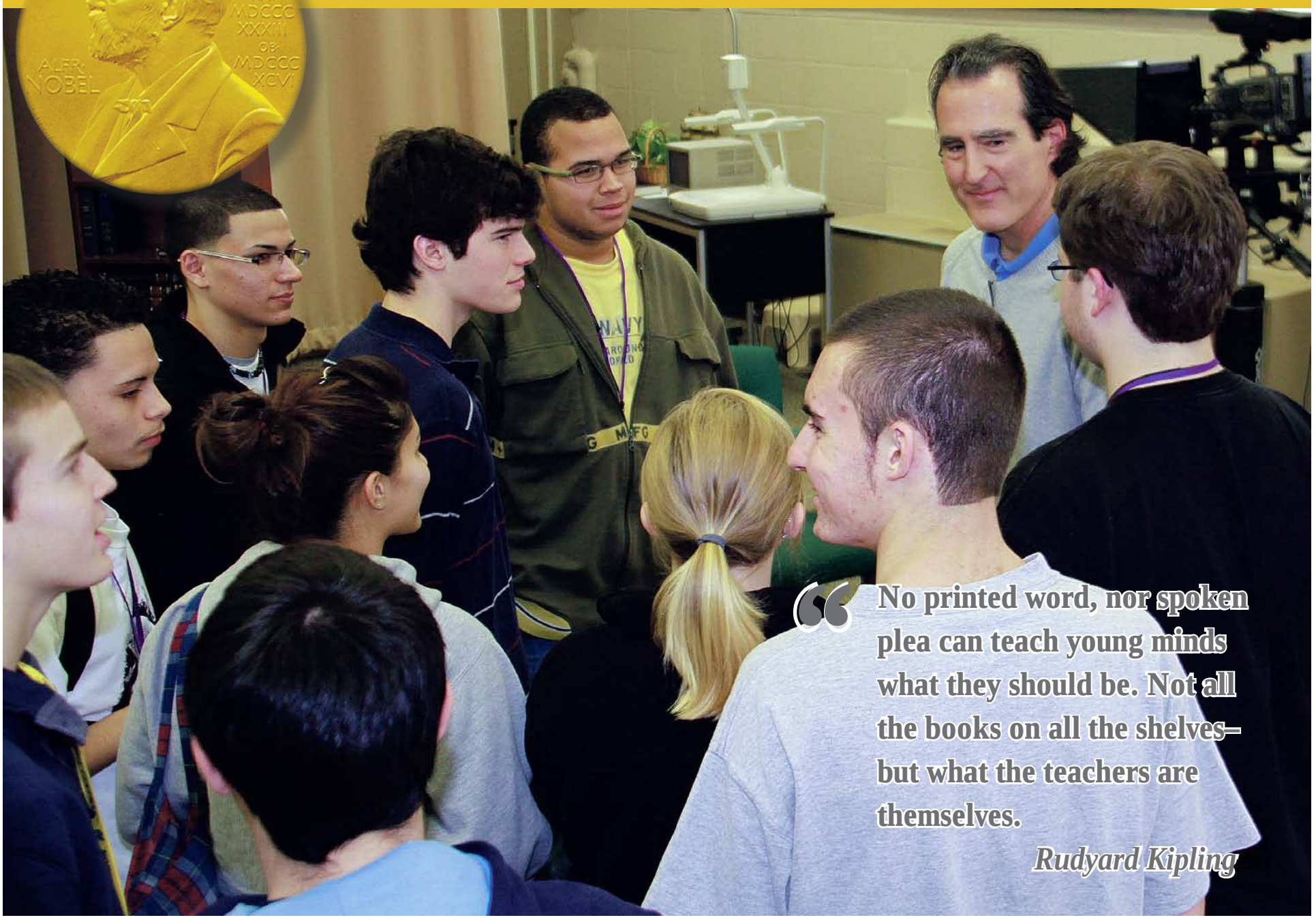


By Laurie Atwater

Nobel Laureate Professor Craig Cameron Mello chats with students from Holyoke High School.

It's Holyoke High School on a busy Monday morning. The air is crisp and cool; the sun bright and refreshing after a relentless series of grey days. The main office is staffed by a smiling older woman who is fully "in charge." Students wander in and out wearing bar-coded badges on lanyards around their necks. A social services worker sits down with a pile of papers that she must fill out to get one of her homeless charges enrolled in school. It is a multi-ethnic urban high school in the center of a very depressed area of Massachusetts.

Holyoke is an old mill town on the Connecticut River. At one time more than 25 paper mills operated in this city of canals. They are gone now. Today the service sector employs many of the residents, but the unemployment rate is higher than the state average. The ethic mix is overwhelmingly Hispanic. For 51 percent of the students at Holyoke High School, English is their second language. With all of these challenges, the school is proud to report an increase in SAT scores for the class of 2009.

Today, Holyoke High School is offering their top science students the chance of a lifetime. Nobel Prize recipient and UMass Medical School professor Dr. Craig Cameron Mello will visit their school and speak with these students. It is a moment of great pride for the school. The superintendent Dr. Eduardo B. Carballo is in attendance along with principal David Dupont and four men from Lexington.

Dr. Ed Shapiro paces the room as the students file in. More girls than boys—about 25-30 kids total take their seats in a small, well-appointed meeting room. Van Seasholes and Raju Govindaraju stand together and

Lexington Luminaries Bring Nobel Laureates to Area High Schools

chat as Dr. Mello moves to the front of the room.

These Lexingtonians are responsible for this very prestigious visit. They are members of the *Nobel Laureates School Visit Series* which they have shepherded together for over a year. These gentlemen—all accomplished in their own right—have dedicated countless hours to this endeavor.

Founder Ed Shapiro is a great admirer of the educational advantages available in the United States, but is concerned about the declining interest in academics and the pursuit of knowledge in our culture. "Making money in this country predominates over anything else—any other interest, any other cultural impulse people might have," he says. Shapiro believes that the future of our country is in the hands of "today's young academic stars."

Shapiro's take: smart kids need role models and who better than a Nobel Laureate to provide that spark?

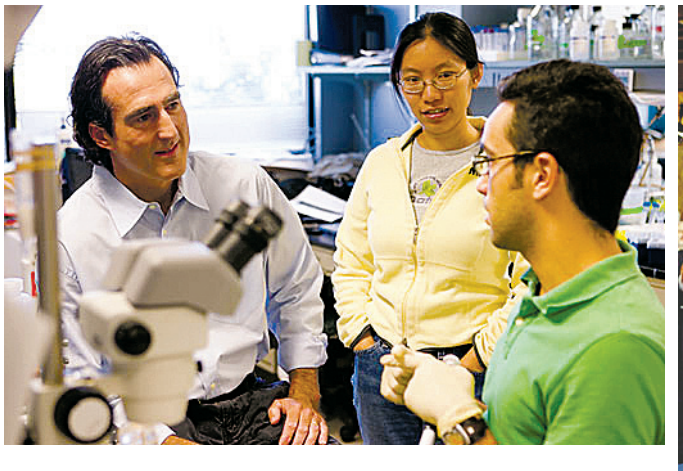
And so, eager students at Holyoke High School sit respectfully as the professor is introduced.

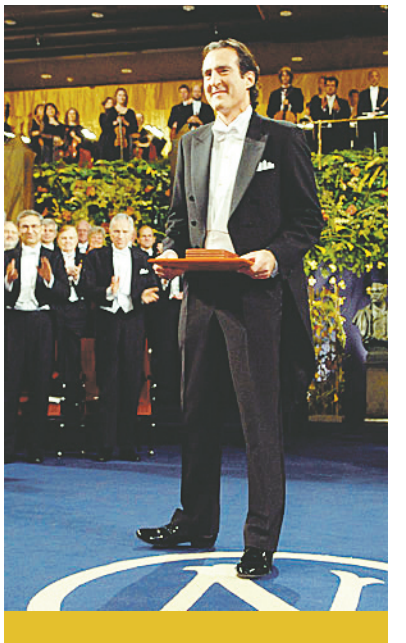
DR. CRAIG MELLO

Dr. Mello is professor in the Molecular Biology program at the University of Massachusetts Medical School. He is a rangy, good-looking 50 year old with longish hair and a quiet demeanor. He looks like someone you could hang out with. He is not what you would expect if you had stereotypical attitudes about science types.

In 2006, Mello shared the Nobel Prize in Medicine with his partner Andrew Fire who conducted his research at the Carnegie Institute for Science (he is now at Stanford). Their work on RNA interference and development began in 1998 and continues today. He was only 46 at the time.

Speaking at Holyoke High, it is apparent that Mello is no stranger to dealing with today's students. He spins the tale of his work with the nematode worm *Canorhabditis elegans* like an experienced storyteller—drawing the kids in with enthusiasm for research which he paints as a suspenseful mystery that reveals





PHOTOS Clockwise top to bottom:

Nobel Laureate Dr. Craig Cameron Mello addresses a group of students, faculty and administrators at Holyoke High School.
Dr. Ed Shapiro addresses the students and introduces Dr. Mello at Holyoke High.
Dr. Mello receives his Nobel Prize. (photo courtesy of UMass)
Dr. Mello works with students at UMass. (photo courtesy of UMass)
Dr. Mello with Ed Shapiro, Raju Govindaraju and Van Seasholes.
Dr. Mello is interviewed for the local news after the event.

HOLYOKE PHOTOS BY JIM SHAW

Nobel Laureates School Visits Series Founder Ed Shapiro (center) with (from left to right) his wife Galina Pekurovskaya, Dan Fenn, Raju Govindaraju, Bill Bloomfield, Phil Flaherty Van Seasholes and State Representative Jay Kaufman.

more clues with each new round of experiments.

Mello clearly loves being a scientist. "You're right at the boundary of what is known and what is unknown," he explains to the eager students. "You're living on the frontier." He is an adventurer—the Indiana Jones of the lab on a quest to unlock the secrets of RNA.

It was this quest that would lead to the discovery of RNA interference (RNAi), a dramatic finding that has revolutionized the world of genetic research.

His explanation of RNA as the "Google" of our cells engaged the students and made science seem as exciting as any video game or adventure movie. You could see them move to the edge of their seats as they become engaged in the science.

RNA is the cellular material responsible for carrying genetic information. Through a series of experiments Mello and Fire discovered that introducing doubled stranded RNA (dsRNA) initiates a process that has the power to seek out and silence the expression of matching genes. This is where the enormous potential of RNA interference lies: by introducing synthetic (siRNA), the sequence of which exactly matches a selected gene, this gene can potentially be silenced.

The discovery of RNAi has completely changed the game in cancer research. By creating double stranded RNA to match harmful or disease-related genes (genes responsible for cancers or diabetes for example), researchers may be able to shut down the expression of that harmful gene in an affected patient. Mello points out this his own daughter who is diabetic may one day benefit from his research. "We can help people," he says. "As scientists we are really trying to make the world a better place."

Dr. Mello muses about the sometimes arbitrary and unpredictable nature of science indicating that often the best discoveries are made by mistake. "You discover something that doesn't make sense. You can ignore it or pursue it." About the RNAi discovery he says, "There were many, many opportunities for other scientists to discover it, but they missed it. That's the fun thing about science."

After speaking briefly, Mello turns it over to the students. Several students ask him about the actual experience of winning the Nobel Prize which Mello said was "really cool and lots of fun" because he was able meet with the royal family of Sweden and bring his family along to the ceremony. The student's questions soon turn to Mello's research and it is clear that many of the students are intensely interested in his discovery. You can almost see the gears turning in their minds as they return again and again with probing follow-ups. "Did you test the theory in other organisms," one student asked; another wanted to know if the silencing effect on the gene would last forever. Several times Dr. Mello says, "Wow, that's a really good question!"

Mello advises the students to "keep a balance" in their lives. "Science should be fun, you should approach it with a passion, but you should keep a balance and experience life to the fullest." He admits that he wasn't always the best student, and up through the 7th and 8th grade he much preferring to be outside in the woods. But he soon began applying himself as a student and says candidly, "Sometimes it's fun, sometimes it's not." He shares the fact that math was always a challenge for him.

When he was young he says, he was interested in astronomy. His dad was a paleontologist and assistant director at the Smithsonian Museum of Natural History. "When I was a kid I learned about deep time," he said with a laugh, but indicates that a lively and intellectually stimulating home life and family support had been important to his development. As he grew older, he says he "couldn't wait to get into a lab."

As an undergraduate at Brown University Dr. Mello majored in biochemistry and molecular biology. He went on to complete his Ph.D. at Harvard.

During his talk Mello heartily encourages all of the students to think about science as a career. "It's a really fun job to be a scientist. You actually get paid to go to school as a grad student," he says and expresses concern about the diminishing number of applications to graduate school by American students.

Ed Shapiro, Van Seasholes and Raju Govindaraju watch the event unfold with satisfaction. At the end of the program, as the students descend upon Dr. Mello, Ed Shapiro beams. "This was great," he says and comments on the intelligent questions posed by the students. "If only one student is inspired to further his or her studies it is worth it."

LEXINGTON LUMINARIES

It came to Ed in the middle of the night—this notion of bringing Nobel Laureates into the public schools for special visits with high performing students. This simple idea has evolved quickly into the Nobel Laureates School Visit Series, a charitable organization based in Lexington.

Dr. Shapiro is passionate, energetic and driven. A native of Russia, he pursued his interest in science at the Ioffe Institute of the Russian Academy of Sciences in St. Petersburg. Like Dr. Alfred B. Nobel, Shapiro's graduate training was in explosives. In 1979, Dr. Shapiro came to the United States and has worked for GTE and Raytheon and other high tech companies. Ed's primary interest is in understanding the mechanisms underlying the origins and conversion of energy in nature. He designed solid-state coolers and power generators that have not been improved upon to this day.

Since his retirement from the private sector, Ed has pursued an ardent interest in the Nobel Prize and the great contributions that Nobel Laureates have made to society. His first philanthropic effort involving the Nobel was to translate all the Nobel lectures into Russian so that students in the former Soviet Union could read them and become inspired by them. Ed and his team commissioned the translation of these great lectures which have been bound into sixty volumes and distributed free to schools and libraries throughout Russia.

"After 2007," Shapiro explains, "an idea kept brewing in my head. In the United States we have between 117-120 Nobel Laureates who are alive! This is the most remarkable sort of inspiration for students—the best possible quality of talent that you could find. Why can't we do something to bring this to students?"

Shapiro knew that he could not do it alone. He credits the support of his wife Galina for keeping him on track. He also knew that he would have to tap into the energy and talents of some of his fellow Lexingtonians. He immediately approached his friend Dan Fenn. "Dan wholeheartedly supported the idea," Shapiro says, and the two put their heads together to advance it with the help of some seed money from IBM Corporation.

Fenn has a rich and varied background including a stint as Assistant Dean of freshmen and professor at Harvard University. He is best known for his service to President John F. Kennedy and his appointment as the first Director of the John F. Kennedy Presidential Library. Those who know Dan know him to be an ardent supporter of local government and an advocate for education. Fenn provided the next very important link in Dr. Shapiro's project. "I had a classmate at M.I.T., Bob Solow, who is a Nobel Laureate. We approached him with the idea and he agreed to jointly draft a letter to area laureates under his signature," Fenn explains.

Based upon that letter and follow-up phone calls from Shapiro, many laureates signed on to participate in the program. Both men are still amazed by the fact that these very busy, highly esteemed intellectuals agreed to jump on board. "They were so happy to do it," Fenn says with admiration. "As human beings they are so candid and so warm and willing to get out there. And, they have found it so much fun and so rewarding."

With a cadre of eager speakers, the program was getting its legs. "It was clear we needed some sort of organizational base," Fenn says. He thought immediately of Van Seasholes another Lexingtonian, former principal of Newton South High School and former interim principal of Lexington High School. Seasholes is a passionate advocate of public education. Van reached out to Phil Flaherty who is the Assistant Director of the Massachusetts Secondary School Administrators' Association (MSSAA). "Phil and I contribute our experiences as teachers and principals to the planning," Seasholes says. "We add a reality base to the undertaking."

Flaherty has helped facilitate the communications with potential host schools through his organization. "I have focused on suggesting schools that are eager to host a visit, to explain to the school personnel the nature and purpose of our program, and to attend meetings as a representative of our eleven hundred members," he says.

Dr. Shapiro has also been joined in his efforts by geneticist and fellow Lexingtonian Dr. Raju Govindaraju. Raju recognizes in the power of inspiration because he experienced it in his own life. "I was lured into the science of genetics after hearing a public lecture by a well-known geneticist, when I was 16," he says. Raju can fix in his mind the very moment when he decided to pursue this discipline and he says, "I never looked back." Dr. Govindaraju has been helping with grant applications

Above: Van Seasholes and Raju Govindaraju sit in the audience with Holyoke students as Dr. Mello addresses the group. Right: Holyoke High School's finest science students with Dr. Mello.

and acting as an ambassador for the program among his many colleagues at the professional conferences he attends.

As the project began to take shape Shapiro simultaneously worked the lists of potential high schools and potential speakers. With remarkable speed and coordination, the eager group was soon preparing for their first visit. Ed Shapiro is not one to leave any part of this endeavor to chance. He prepares for each presentation with intensity; working with the school principals, visiting the sites, providing materials to help prepare both the Nobel Laureates and the students and serving as host on the day of the visit. His reverence for the guests is apparent and his respect for their work complete. "Ed Shapiro is a man of great intelligence, commitment, imagination, and passion," Van Seasholes says with great admiration for the project's founder.

"We wanted them [the laureates] to talk about their lives and what has brought them to such eminence," Shapiro explains. "We have so many different types of role models in this country, but we do not have intellectual role models for aspiring students." In fact, members of the group are generally shocked and disappointed by the role models that have emerged in the past years when as Van Seasholes says, "Entertainers, including athletes, have such exalted positions."

To inspire high performing students to persist in their studies, to think beyond the obvious and to see a reward for this life is a difficult sell in this culture. This is precisely why Shapiro feels that the Nobel Laureates can provide both an inspiration for good students and validation for their continued diligence. "It's important," says Dan Fenn, "that high school students' know that being the captain of the football team isn't the only thing that should be celebrated."

"We want today's young academic stars to go beyond any limits, to persevere and excel and to follow in the footsteps of the Nobel Laureates," Ed Shapiro says succinctly.

In February of 2009 they launched the pilot phase of the program with Nobel Laureates: Professor Sheldon Glashow, Professor Dudley Herschbach, Professor David Hubel, Dr. Richard Roberts and Professor Frank Wilczek. They visited five high schools: Dennis-Yarmouth, Milford, Medway, Plymouth North and Taunton. Since then, Nobel Visits has sponsored Dr. Craig Cameron Mello who spoke at Holyoke High and Dr. Robert M. Solow who visited Boston Latin.

To motivate students to follow these pied pipers of science is what it's all about, but if you want a teenager to follow, you'd better have an exciting path. That is what is so surprising and instructive about this program. These Nobel Laureates defy any stereotypes about science-types. Their rich lives, diverse interests and amazing personal stories really resonate with the students. They connect. For these laureates science is an amazing pursuit, a great adventure and a wonderful way of life. Walking away, you are inspired to pursue your own personal best whatever it may be.

DR. DAVID HUBEL

Dr. David Hubel addresses students at Taunton High School. He is both a professor and researcher at Harvard and he received the Nobel Prize in Medicine with his partner Torsten Wiesel in 1981. Dr. Hubel was born in Canada and attended McGill University majoring in math and physics. Working at Johns Hopkins, the pair proved the link, and explained the complex relationship between the brain and the visual system of the eye. Their research also established that visual development occurs very early in childhood which has been an invaluable revelation for researchers.

At Taunton High School Dr. Hubel talks with great humor about his early years. His father was a chemical engineer and provided inspiration for the aspiring student. Dr. Hubel describes a chemistry lab that he had in the basement when he was a kid saying that his dad "would have been shaken if he knew what I had in that basement!"

Dr. Hubel began his studies in physics, but he developed an interest in medicine and had to make a difficult decision between physics and medical school. "In the big decisions in life, you may have to jump one way or another and hope for the best," he says. "I got a bee in my bonnet that it might be fun to go to medical school," he laughs. That risk-taking mentality and his willingness to be flexible and follow his interests led him down a path that would lead to a Nobel Prize.

Dr. Hubel cautions the students to ignore stereotypes about research and lab work. "You have to be careful about preconceptions. Science is done in labs with lots of people," he says. "I probably get to know my students a lot better than doctors get to know their patients. You mustn't think that being a scientist separates you from other people."

Dr. Hubel, like Mello stresses the importance of the "fun factor." "Go for a career where you think you will enjoy yourself. It's so important to have fun." And relax he says. He describes a summer job he had on a farm in Canada that he enjoyed immensely.

"You may make wrong decisions, and when you do it's important to cut your losses." Like Mello he describes the need for flexibility and balance in life. He talks about his hobbies—Hamm radio, music and star-gazing. "My motivation has been

Ed Shapiro with Nobel Laureate Dr. David Hubel at Taunton High School.

Nobel Laureate Frank Wilczek with Nobel Visit board members and teachers and administrates from Medway High School.

primarily curiosity," he says. And Dr. Hubel is still curious. He continues his research at Harvard and he gives back by offering a seminar and working closely with beginning students each year.

Finally he advises, "Learn how to communicate. Learn how to write and to speak."

DR. FRANK WILCZEK

At Medway High School Frank Wilczek, 2004 Nobel Laureate in Physics describes his immigrant grandparents who wanted to "make good in America." He begins his talk with an anecdote about a mechanic and offered up an algorithm for finding the perfect mate in life! The students were right there with him.

He admits that his parents would have liked him to be a doctor or an engineer, but they were always supportive of his interests and happy when he did well in school. Wilczek explains that when he was young the country was mobilized to fight the Soviets during the Cold War. "The nation was invested in science and technology at that time," and he said that it "seemed natural to learn more and more."

Wilczek says that he joined the Mr. Wizard Club when he was a kid and loved to visit the New York Public Library. "These things plant seeds," he says. His dad worked in electronics and there were always plenty of objects around the house being taken apart and put back together. His parents were always supportive of his academics and his goals.

At the University of Chicago he "tried many things," but wound up a math major although a course in physics during his final semester really inspired him. During Graduate School at Princeton he was once again riveted by "the exciting things that were happening in physics that I could relate to." He was uncommitted at the time, in a "period of crisis," but like Hubel, he followed his curiosity about theoretical physics, "jumped in and never looked back."

Wilczek encourages students to nurture "their most important tool—their brains," and to respect their bodies by staying healthy. And, he says, "Use your imagination. Find out what you fall in love with."

Wilczek's prize, which he shared with David Gross and David Politzer, was based on research that contributed to our understanding of particle physics and the force that ties together the smallest pieces of matter – the quarks. Their theoretical contributions made it possible to complete the Standard Model of Particle Physics, the model that describes the smallest objects in Nature and how they interact.

REGULAR GUYS

Ed Shapiro and his group have been stunned the unassuming, humble and approachable temperaments of their speakers or as Raju Govindaraju put it: "their disdain to be recognized as celebrities."

"I have been pleasantly surprised at how well it has gone," comments Van Seasholes. I was afraid the laureates would lecture on too high a level. They have, in fact, spoken and connected with the students."

Fellow educator Phil Flaherty agrees. "I have been impressed by the rapport which seems to exist almost immediately between these very learned people and the audiences of high school students," he comments. "The level of questioning and response in all of the visits has been truly remarkable."

It's this down-to-earth quality that resonates long after the event is over along with so many similarities. Each laureate had support and inspiration in their younger years, wide-ranging interests, overwhelming curiosity and passion for their pursuits. They are flexible, resilient people who have been able to persevere, to collaborate and to achieve success with hard work along with (as they all admit) a bit of good luck.

This remarkable program is growing at a breakneck pace. In October, on the suggestion of Dr. Govindaraju, Dr. Shapiro added William Bloomfield of Civic Strategies Partners in Lexington to his team to help grow and expand the reach of the program. Dr. Bloomfield has extensive experience with educational initiatives. He feels that the program helps to address a weakness in our secondary education programs. "Students frequently are not given opportunities to connect what they study in class to any practical application in the real-world," he says. "The Nobel Laureate visit offers students a glimpse into the real world of science by introducing them to people who have made the connection…One never knows what provides the motivational spark that turns kids on." State Representative Jay Kaufman is also onboard to provide his unique insights into education policy and funding and his abiding concern for the quality of our public schools." Ed Shapiro deserves a Nobel himself for creating and nurturing this program and it has been an honor to work with him and the other board members to make his dream real.

Next week Dr. Richard R. Schrock, 2005 Nobel Laureate in Chemistry will visit Winchester High School. The *Nobel Laureates School Visit Series* continues to reach out to high schools to offer this unique opportunity to aspiring students.

Ed Shapiro is quite convinced that a future Nobel Laureate may be sitting in one of these lectures.

To learn more about this program, contact:

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