CPS Plasma Page

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Fridman Reveals "Miracles" of Plasma Medicine at Congressional Talk

Washington, DC - On May 23, 2011, Prof. Alexander Fridman from Drexel University introduced a roomful of congressional staffers and other interested guests to the new world of plasma medicine - a world in which a plasma device the size of a cell phone can hasten blood coagulation and heal bleeding wounds.

During his talk, "Plasma Medicine: Healing Wounds and Beyond," Fridman first guided the audience through the difference between hot (or thermal) plasmas, such as bolts of lightning, and cold plasmas like those found in TV screens or fluorescent lights. In the cold plasmas used for medical applications the electrons are very hot, but there are so few of them that the plasma can remain relatively close to room temperature and safe for contact with human tissue. Additionally, the plasma is administered to the wound in nanosecond pulses. The research is focused on making the plasma discharges uniform and safe.

Experiments have shown that a 15-second plasma treatment will coagulate blood completely in two minutes, as opposed to 13 minutes without plasma. Plasma does not "cook," but stimulates natural processes, like the creation of cells, quickening not only blood coagulation but the entire healing process. Fridman told the story of a fellow researcher who, wanting to test the healing powers of plasma before much experimentation had been done, cut his own finger, then exposed it quickly to a plasma source. After 24 hours there was no sign of the wound.

Fridman explained further how plasma could help treat skin diseases, such as Leishmaniasis (Black Fever) a parasitic disease spread by the sand fly that leaves the skin prone to ulcers and sores. Plasma can also affect apoptosis in skin cancer cells. Other health related applications would be an *in vitro* treatment for inflammatory bowel disease, sterilization of water, working surfaces and food, as well as killing toxic spores in the air.

Alexander Fridman discusses medical plasma applications with a member of the audience.

Noting the language barrier between physicists and medical doctors as a primary challenge to future progress, Fridman concluded, "We can do miracles. The question is, what will happen next year."

CPS Vice Chair Gerry Rogoff - 1939-2010

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Gerald Rogoff

Dr. Gerald L. Rogoff, 71, of Framingham, MA, died Wednesday, Dec. 8, 2010 in Framingham. He was born on June 7, 1939, the son of the late Samuel and Diana (Olderman) Rogoff. Devoted husband of Elizabeth (Preston) Rogoff of Framingham, he was also the loving brother of Myrna Zoll of New York City, N.Y., and uncle of Amy Zoll of Philadelphia, Pa., and David Zoll of Albany, N.Y. Dr. Rogoff earned a Ph.D. at MIT in physics and was a physicist and researcher for Westinghouse Research Labs in Pittsburgh, PA, for GTE in Waltham, MA and later Osram Sylvania in Danvers, MA where he retired with 30 years of research in plasma lighting sources for the plasma industry.

The following from Dr. Igor Alexeff of the University of Tennessee, Knoxville, and Dr. Richard Temkin, MIT Plasma Science and Fusion Center, Gerry's longtime colleagues, sums up his passion for teaching students, teachers, members of Congress and their staffs and the general public about plasma science:

Gerald Rogoff was a founding member of the Coalition for Plasma Science (CPS). He was elected Chairman of the Coalition in 1998 and served in that capacity until 2004; subsequently, he served as Vice-Chairman. Gerry was responsible for making the Coalition a much stronger group that achieved widespread support from the science community, including direct support by the IEEE NPSS and the APS. Gerry continued to be active in the Coalition until only a few weeks prior to his untimely death. Gerry also served as Chair for Membership and Recruiting for the Coalition. Gerry was very interested in promoting Plasma Science, and organized the Coalition for Plasma Science to inform the public of both the importance and the breadth of the field. He held public meetings to demonstrate the importance of various components of the field, supported

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student involvement at ICOPS and elsewhere and had regular information meetings with members of Congress. His group developed plasma demonstration equipment.

His last position was as visiting scientist at MITs Plasma Science and Fusion Center in Cambridge, MA where he worked closely with several staff members on producing informational leaflets for the CPS. Dr. Rogoff was a member of IEEE; American Physical Society; and AOPA as a private pilot.

Two Students win CPS prize at INTEL Science Fair

Los Angeles, CA – For the first time since 2005, CPS judges at the Intel International Science and Engineering Fair (ISEF) have awarded their "Excellence in Plasma Science" prize to two projects. The last time this happened was the first year CPS created the award, and the two winners split the $1000 prize. This year each winner received $1000.

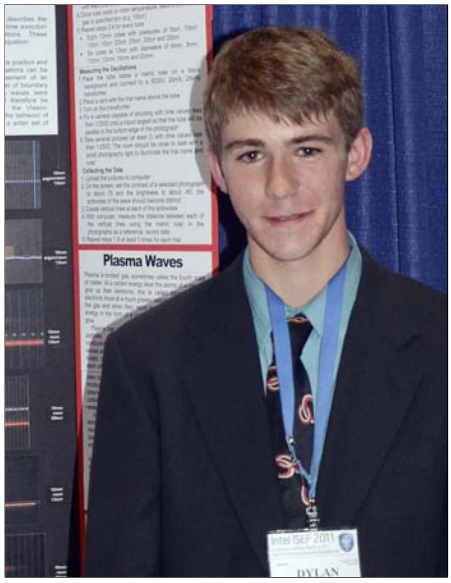
William Jack *Photo/Lee Berry*

William Jack, 16, of Hudson High School (Hudson, OH) and Dylan Moore, 17 of Alameda Community Learning Center (Alameda, CA), were two of more than 1500 young scientists and mathematicians from 65 countries, regions and territories who gathered in Los Angeles, California, the week of May 9 to participate in the Intel ISEF 2011. Of that number, a record fifteen projects dealt directly with plasma science.

William Jack's project, *D+D Fusion Reactions in an Inertial Electrostatic Confinement Fusion Reactor,* presented the possibility of studying specific D+D fusion reactions using an inertial electrostatic confinement fusion reactor. The judges were impressed by the very careful measurements William made. According to CPS Chair Lee Berry, "William demonstrated a good understanding of the need for careful controls to prove that his boron counts were indeed fusion neutrons." Berry was also impressed that Williams recognized the limitations of this experiment in terms of fusion, and that he focused on the possibility of non-energy applications, such as isotope production.

Dylan Moore's interest in exploring *Finding Harmonics in Plasma* began in a shop where his father creates neon tubes. Noticing the light and dark moving striations in the plasmas contained in the tubes, Dylan wondered what was causing this phenomenon, and if one could predict the oscillation spacing by comparing its relationship to gas pressure and tube diameter. He learned from his father how to make tubes, creating different sizes and filling them with different gases under a variety of pressures. The judges were impressed with Dylan's "curiosity-driven research." According to Lee Berry, "He saw things happening in the tube that he wanted to learn more about; and so he designed experiments to try to explain what was going on. Rather than go to some data source on the web as the basis of his project, he discovered his own data." Other Intel ISEF judges were also impressed with Moore's approach. Besides receiving the CPS award, Dylan also received a full scholarship to Drexel University in Philadelphia, valued at $150,000; and the Second Award ($500) from the Vacuum Technology Division of the American Vacuum Society.

Of the remaining 13 Plasma projects, five were awarded prizes from other organizations. Three plasma projects were selected to be among 12 to travel to CERN, in Geneva, Switzerland. These were: Kamal Shah, 18, from Dr. Ronald E. McNair Academic High School (Jersey City, NJ) for his project. *Characterizing the Spectral and Flow Characteristics of*



Dylan Moore *Photo/Lee Berry*

Microhollow Cathode Discharges; Nicole Yeechi Tsai, 17, High Technology High School (Lincroft, NJ) for *Extending the Motional Stark Effect Diagnostic to Low Magnetic Fields: Towards Implementing a Laser-induced Fluorescence Technique*; and Nicholas James Nothom, 16, Waconia High School (Waconia, MN) for *The Aurora Accelerator*.

Mr. Notham also received an award from the Florida Institute of Technology, a scholarship of $15,000 per year, renewable annually. This scholarship was also awarded to Elizabeth Gray 17, Union County High School, Lake Butler, Florida, for her plasma project *Optimization of DBD Plasma Actuator Geometry for Maximum Force Production*.

Finally, Lois Therese Gagnon, 16, Gagnon Family Homeschool (Goodrich, MI) received American Association of Physics Teachers and the American Physical Society Third Award ($500) for his project *Detection of Radioactive Isotopes in the Radon Decay Chain Using a Homemade Ion Chamber*.

Congratulations to all partipants!