

Tribute to a Genius: The electrifying legacy of Nikola Tesla

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With preparations under way to commemorate the 150th anniversary of Nikola Tesla's birth, members of the Serbian-American community are heartened that their Balkan countryman is gaining widespread recognition as one of the greatest pioneers in the history of electrical science.

On June 4, a tribute to Tesla will be held at St. Sava Serbian Orthodox Cathedral in Parma. Organized by Paul Cosic, a Serbian-American businessman, the event is open to the public and includes a memorial service, followed by a banquet at 1 p.m. The keynote speaker will be Professor Jasmina Vujic, the chair of the department of nuclear engineering at the University of California, Berkeley.

Tesla, the son of a Serbian Orthodox priest, was born July 10, 1856, in what is now the Republic of Croatia. A physicist, mechanical engineer and electrical engineer, Tesla migrated to the United States in 1884 at age 28. Over the next six decades, he was responsible for numerous inventions relating to radio devices, electrical transmission and electrical motors. Tesla held dozens of basic U.S. patents for his poly-phase alternating current (AC) system of generators, motors and transformers, which eventually supplanted Thomas Edison's direct current (DC) system.

Along with his impact on modern technology, Tesla also was an influence on generations of aspiring engineers, particularly in his homeland. "From an early age, he was kind of my hero," says the Serbian-born Vujic, who is the first woman to lead a nuclear engineering program at a U.S. university. At UC Berkeley, Vujic has organized a freshman-level course on Tesla, entitled Nikola Tesla: The Genius Who Lit the World.

Ana Stankovic, a native of Serbia who is now an associate professor in Cleveland State University's department of electrical and computer engineering, says Tesla was also a motivating factor in her career choice. "As a student in Serbia, I learned about Tesla very early in my life," Stankovic says. "My father is also an engineer, and he talked about Tesla a lot."

A specialist in the principles of electric machines and power electronics, Stankovic began her career at the Nikola Tesla Research Institute in Belgrade, Serbia. As a Serbian-American, she says she is proud of Tesla's scientific contributions. "Tesla definitely inspired me to become an expert in my field," she notes. "He discovered the rotating magnetic field, which is the basis for most alternating current machinery, including the induction motor. It would be hard to imagine a world today without his inventions."

Stankovic explains that Tesla relocated to the U.S. to take advantage of the financial resources available here for scientific research. "During that time, he was able to find support in this country for his work," she says. "Even today, many foreign scientists are drawn to the U.S. because of the research and development opportunities here."

Vujic says she is somewhat disappointed that Tesla is still not credited for many of his fundamental inventions. Scholars offer a number of reasons for Tesla's relative lack of recognition, including his occasional eccentricity, his professional rivalry with Thomas Edison, and the fact that he sold off his AC patents to Westinghouse.

"It's really amazing what he accomplished," Vujic says. "Nobody else had similar ideas. In Serbia, we learned about him in school. But when I came to the U.S., I was surprised that very few people know about Tesla and his inventions. That's strange because most of his accomplishments were done in this country."

Noting that general interest in Tesla has increased in recent years, Vujic proposes that the year 2006 should be dedicated to Tesla and the impact of electrification. Last year, a consortium of physics organizations named 2005 as the World Year of Physics.

"However, Tesla's inventions of AC transmission and motors had a greater influence on the average person," says Vujic. "Without his inventions, the widespread electrification that has touched the majority of people on this planet would not have been possible."

Tesla celebration set

Paul Cosic, organizer of the June 4 Nikola Tesla tribute at St. Sava Serbian Orthodox Cathedral, says he is focused on commemorating Tesla's legacy and educating the community about his accomplishments. Cosic has recently formed two nonprofit organizations: The Foundation for Nikola Tesla and The Serbian American Society of Nikola Tesla of Cleveland.

"I want people to know what Tesla did for mankind," says Cosic. "Every motor, every appliance, and every tool that uses electricity depends on Tesla's principles." Cosic has plans to eventually construct a building that will house books and artifacts relating to Tesla, as well as an auditorium and library. "I've come to realize that schools don't teach young people about Tesla," he says. "I want to help educate the kids about this great inventor."

Tesla Memorial Tribute, June 4, Sunday, at St. Sava Serbian Orthodox Cathedral, 6306 Broadview Road, Parma. For information, call (216) 691-6444.

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The genius of electricity who lit the world

by Sinisa Stanisavljevic, MD

Nikola Tesla, a Serbian-American inventor, was born in Smiljan, in the province of Lika (then Austria-Hungary, now Croatia), on July 10, 1856. Tesla grew up in a religious family; his father and maternal grandfather were priests in the Serbian Orthodox Church. After studying mathematics and physics at the Polytechnic Institute in Graz and philosophy at the University of Prague, Tesla decided to turn to electrical engineering.

In 1881, at the age of 25, while working at the telephone exchange in Budapest, he invented a telephone repeater. While working 19 hours a day, he experienced a nervous breakdown and while recovering, he had a vision of his alternating current (AC) induction motor. In 1882, the Edison Company, based in Paris, hired Tesla, but no one expressed interest in his AC power system. Europe was unable to bring his idea to practical application. Yet one of his bosses, Charles Batchelor, who had worked with Thomas A. Edison, sent Tesla to New York with one of the most prophetic letters of recommendation ever written. Batchelor wrote to Edison: "I know two great men and you are one of them: the other is this young man."

In 1884, Tesla came to the U.S., with knowledge of a dozen languages. Edison hired him on the spot. Both Edison and Tesla were extremely brainy; however, Edison, who was committed to the use of direct current, rejected Tesla's ideas for AC power system. As a result, Tesla spent less than a year in Edison's workshop in New York. In 1888, he formed an alliance with George Westinghouse, a descendant of the aristocratic Russian von Westinghousen family. Westinghouse had experience and vision; he realized the practical advantages of the AC power system. The Westinghouse Company financially supported Tesla's work and brought his AC system to practical application. However, a tug of war between the Tesla AC and Edison DC systems continued for years. Finally, in 1892, the Westinghouse Company and Tesla AC power system won the game. Westinghouse won the right to provide the power system to light the 1893 World's Columbian Exposition in Chicago.

In 1894, Tesla received honorary doctorates from Columbia and Yale. The following year, Tesla put into commission the first electric power plant based on his principles in Niagara Falls. This crucial event signaled America's inevitable conversion to the Tesla AC power system. The Niagara Falls Project is the world's first hydroelectric power plant and a network for transmitting electric power.

Owing to this successful project, Tesla and Westinghouse started the electrification of America and the world.

Tesla's tremendous contributions to power transmission revolutionized the power industry and provided the basis for the modern electric power industry. Without Tesla's AC power system, our cities would be dark, subway trains would stop, and modern life would be almost inconceivable. Among Tesla's other inventions are fluorescent and neon lighting, wireless transmission and remote control. In addition, he outlined the principles of radar, and anticipated the development of robotics and modern electrical technology.

It is considered that Marconi invented the radio; however, hardly anyone knows that Tesla described his first radio apparatus in detail in 1893, two years before Marconi presented his radio device, claiming it as his original invention. When Marconi sent his famous "S" signal across the Atlantic, Tesla said: "Let him continue. He is using 17 of my patents. Let the future tell the truth and evaluate each one according to his work and accomplishments." Despite that, Marconi won the Nobel Prize in 1909 for the development of wireless telegraphy. In 1943, a few months after Tesla's death, the U.S. Supreme Court upheld Tesla's radio patents and restored the priority of Tesla's patents over Marconi. Since it happened in the middle of World War II, the decision of the U.S. Supreme Court was unnoticed. How many facts are incorrectly described in our books, while the reality is completely different?

In 1901, with the financial backing of J. P. Morgan, Tesla began work on his "World System" for wireless communication and power transmission in Wardenclyffe, Long Island, New York. This was the first broadcasting system in the world. Tesla's dream was also to transmit electric power wirelessly from his laboratory to the whole globe using the Ionosphere. In 1905, however, Morgan withdrew his support and Tesla's dream of wireless electric power transmission did not come true.

Although he enjoyed fame, Tesla made little money from his inventions. For the last decade of his life, Tesla was dependent on a yearly gift of \$ 7,200 from the Yugoslavian government. In 1942, King Petar II of Yugoslavia visited him in New York and paid tribute to him for his inventions. In 1943, Nikola Tesla died at the age of 87 in the Hotel New Yorker in Manhattan in room 3327. More than 2,000 people attended the funeral at the Cathedral of St. John the Divine in Manhattan. President Franklin Roosevelt paid tribute to Tesla; the mayor of New York, Fiorello La Guardia, read a eulogy on the radio.

The memory of Tesla and his works goes on living in the United States, Serbia and throughout the world. In The U.S. National Hall of Fame, Tesla is included in the list of great men of this country. In 1956, The International Electrotechnical Commission adopted the name "Tesla" for the unit of magnetic flux density. According to The Discovery Channel, Nikola Tesla is among the "100 Greatest Americans." The website of The Tesla Memorial Society of New York has a great collection of Tesla's photographs and documents, keeping the memory of Nikola Tesla alive.

Yearly, The Nikola Tesla Foundation in Belgrade, Serbia, awards The Nikola Tesla Prize for exceptional students and inventors. The Nikola Tesla Museum in Belgrade presents his most significant discoveries, documents and personal belongings. In a special room of the museum, the urn with Tesla's ashes is kept. Humankind is permanently indebted by Tesla's epochal discoveries. Edwin H. Armstrong said: "I believe that the world will wait a long time for progress and imagination equal to Tesla's."

This year, the world celebrates the 150th birthday of Nikola Tesla. In view of this anniversary, in Belgrade, The Tesla Tower, visible from an airplane, will be constructed and will become a symbol of the capital of Serbia. In addition, Belgrade's International Airport will be renamed Tesla International Airport. In April, a ship named "Tesla" will leave Belgrade's port and by rivers, canals, the Atlantic Ocean and lakes, will come to Niagara Falls on July 10th, where there will be a celebration of his 150th birthday. Then, via Lakes Erie, Huron and Michigan, the ship will arrive in Chicago. During the trip, the ship's crew will make a documentary about passing through cities where Tesla lived and worked. In addition, on April 28th, The Njego Endowment at Columbia University will organize a Symposium on Nikola Tesla, gathering many scientists and Tesla researchers.

Tesla, the founding father of modern electrical technology and wireless transmission, summed up his own life in these words: "I continually experience an inexpressible satisfaction from the knowledge that my polyphase system is used throughout the world to lighten the burdens of mankind and increase comfort and happiness, and that my wireless system, in all its essential features is employed to render a service to and bring pleasure to people in all parts of the world." Doubtless, the history of the AC power system and wireless transmission is the history of human progress.

Further reading about the life of Nikola Tesla

Mark J. Seifer, "Wizard: The Life and Times of Nikola Tesla, Forgotten Genius of Electricity" (1996).
Margaret Cheney, "Tesla: Man Out of Time" (1981).
Robert Lomas, "The Man Who Invented the Twentieth Century: Nikola Tesla, Forgotten Genius of Electricity" (2000).