

Fascination of Electrical Engineering

Dialogue

By LONG Yun & BI Weizi

Vladimir Terzija, a distinguished visiting professor at Shandong University (SDU) is an important figure in the field of electrical engineering and electrical power systems. On an afternoon just after New Year's Day, he shared some of his thoughts on exploring the secrets and complexity of electricity with *Science and Technology Daily*.

Inspired by predecessors
"Electricity has always been fascinating to me," Terzija said, adding that he was inspired by the legendary Serbian inventor Nikola Tesla.

The Wide-Area Monitoring, Protection and Control (WAMPAC) is one of his research focus areas. Terzija regards it as a complex but inspiring technical system. "It involves satellites, communication channels, and specialized sensors like time-synchronized phasor measurement units," he explained. This system plays a crucial role in monitoring, controlling, and protecting modern electrical power systems.

Terzija said music serves as a muse for his research. He intertwined his passion for music with the complexities of power system frequency measurement. His scientific contributions lie in creating new, efficient digital algorithms for power system frequency measurement, which are now integrated into modern digital devices and WAMPAC systems worldwide.

However, his journey doesn't stop there. Terzija connects his fascination with music to the world of electrical arcs, revealing the complexities of this natural phenomenon. On his journey of discovery, he developed mathematical models for electrical arcs and applied this knowledge to designing digital algorithms for the protection of transmission networks.



Professor Vladimir Terzija speaks at PowerCon 2023 held in China. (COURTESY PHOTO)

Reliable, secure, green

"The Chinese electrical power system is huge and strong, covering a huge geographical area," he said. With more than 1.4 billion people relying on a robust, secure, and reliable power supply, preventing faults and blackouts becomes crucial. The WAMPAC system, designed to address faults and prevent blackouts, greatly supports China's defense against power system outages.

By understanding the system's dynamics through monitoring based on satellite technology, China has designed an effective defense mechanism. This defense system, built on the results of Terzija's research, contributes to the efficiency, security and reliability of the Chinese electrical grid.

Beyond blackout prevention, Terzija's research has also focused on addressing real-world challenges related to Smart Grid applications and multi-energy systems. The increasing complexity of modern power systems, which integrates renewable energy sources and storage units into power grids, demands advanced technology. His work in Smart

Grid applications supports the secure and reliable operation of these complex systems.

Moreover, Terzija emphasizes the integration of various energy systems as a solution to maximize renewable and green energy utilization. He highlighted the potential solution lies in the integration of various energy systems, such as combining electricity and heat systems or electricity and gas systems, or even all these together.

Through this integration, a flexible operation of the overall system can be achieved, leading to the optimization of renewable energy resource usage. From his perspective, flexibility and diversity play crucial roles in reducing CO₂ emissions in order to achieve clean energy generation and ultimately meet net-zero targets.

As the editor-in-chief of the International Journal, *Electrical Power and Energy Systems* (Elsevier), Terzija envisions a future where power systems seamlessly meet the demands of modern society. He is ready to embrace cutting-edge technologies, saying, "I am in-

sisting on those solutions involving the most modern technology, smart grid solutions based on new sensors, advanced technology communication infrastructure, and complex and robust algorithms based on artificial intelligence. These will make our power system resilient and economical."

Fruitful collaboration

Terzija's collaboration with SDU since 2012 has been evolving constantly. The cooperation began with Professor Ding Lei, Dean of the School of Electrical Engineering at SDU, and their joint efforts in developing algorithms for the prevention of power system blackouts, which laid the foundation for new groundbreaking solutions.

"Today, algorithms are recognized as very efficient solutions, which are applied worldwide," said Terzija. The collaboration has expanded with strong support from many well-known Chinese scholars at SDU, opening doors to numerous collaborative projects. Meanwhile, he stressed the students' role in contributing to the quality and quantity of scientific results that they have achieved by now.

Commenting on his Chinese co-workers, Terzija said, "They are inspiring me. Their ambitions are motivating me to be even more involved in this activity." According to his former student Jin Zhaoyang, now an associate professor at SDU, Terzija consistently motivates students, propelling them forward to face challenges in both research and life.

In terms of research endeavors, his focus lies on addressing Big Data challenges in secure and reliable power system operations, as well as exploring topics related to the digitalization of the grid.

"One of my key duties is to make sure that a new generation of successful and capable professors take over the research activities which I'm running now," he said.

This article is also contributed by Wu Ke from SDU.

Letter to the Editor

Building a Lifelong Friendship Bridge

By Dubkova Olga

Bridge construction begins with design. My family, members of the Communist Party of the USSR, instilled in me love for the motherland, dedication to my work, and respect for all people. They were selfless in their devotion to making the world better. My grandfather fought against the Nazis, and my maternal grandparents worked in China from 1939 to 1946. Their collective experience and dedication inspire me to this day.

I have the fortune of teaching Russian as a foreign language to Chinese students. It wasn't easy for me at first because everything was new: new culture, new traditions, new customs. But I'll never forget the joy of communicating with those first students, which is a feeling all teachers will understand.

From the very beginning, I wanted to understand China and feel the Chinese spirit in a meaningful way. In the mid-90s, I came to China for the first time, to see this great country with my own eyes. Almost 30 years later, this feeling of admiration and respect for Chinese culture and language has never wavered. The more I learn, the more I want to share these feelings with friends and colleagues in Russia.

Through "Chinese stories," scientific articles, textbooks and monographs, I convey how incredible the Chinese civilization is, and how important it is to strengthen good relationships between our peoples.

The bridge of friendship cannot be built by one person, it requires all of us. My colleagues share their knowledge with me and, together, we have translated and published a large collection of scientific, socio-political and educational literature.

When we work together, we try different approaches. This creates common knowledge that connects our consciousness, a strong foundation for the bridge of friendship and mutual understanding. The strength and future of our friendship bridge depend on that foundation.

Translating books is difficult, but when you receive that completed published book, all the difficulties are forgotten and we feel only pride for our success and joint work. I work hard



Professor Dubkova Olga. (PHOTO: Xi'an International Studies University)

because it is my duty. I'd like to stand on the front line, nurturing youth who selflessly love their homeland, understand the past well, and understand different peoples and civilizations.

I've been lucky enough to communicate with three generations of students. All of them have stories that will add to my understanding. For example, one student's father brought apples to the university and wanted to give them to me. I still remember the taste of those apples. Respect for teachers is an age-old Chinese value.

Another time, I learned that a student did not eat the candy I gave, instead, she gave it to her grandparents. Respect for elders is a Chinese tradition dating back to the Spring and Autumn period. These ancient traditions define China and, in communicating these stories to me, my students strengthen their understanding of their own customs and traditions. I learn together with my students, and together we are building a bridge of friendship that will withstand any test.

My friends are also part of that bridge. We share our experiences, difficulties and aspirations, and have common dreams. Since I, as a teacher, believe spiritual development is most important, I am constantly trying to improve myself and my students. With knowledge and hope, we can build a strong bridge that will stand for centuries.

The author is a Russian teacher from Xi'an International Studies University.

Service Info

China Takes Measures to Facilitate Foreigners' Entry and Stay

A set of measures had been put into effective to facilitate the entry of foreigners to China for business, education and tourism, according to the National Immigration Administration (NIA).

The new measures, effective from January 11, 2024, include a relaxation of port visa application requirements

and access to visa extension, replacement, and issuance services at local immigration departments for foreign nationals coming to or staying in China for non-diplomatic and non-official purposes such as commercial cooperation, exchanges, investment, entrepreneurship, visiting relatives and personal matters.

Foreigners enjoy 24-hour direct transit without undergoing border check procedures at nine major airports in cities, including Beijing, Shanghai, Hangzhou, Xiamen, and Guangzhou.

Additionally, multiple-entry visas are available for foreigners in need, and the application requirement for visa documents has been streamlined for

foreigners staying in China, said NIA.

The NIA vows to continuously advance reforms and innovation in immigration management services and policies, improve the business environment, and contribute to the creation of a new development pattern.

Source: XINHUA

How to Deal with Lingering Cough

Science Outreach

By Staff Reporters

ry disease epidemics is a common winter infection, not a new pathogen, nor caused by the novel coronavirus mutant strain.

Wang Huaqing, chief expert at the Chinese Center for Disease Control and Prevention, said the pathogens currently being monitored are mainly influenza viruses.

These viruses cause flu and cold-like symptoms that can last for some time. When a virus enters our respiratory tract, it infects our cells and replicates. This can cause a lot of inflammation and irritation in the throat, nose and chest that lasts for a long time.

In fact, Sun says the persistent cough is most likely due to prolonged inflammation in the airways — even after the virus is gone, the body continues to produce mucus and have bron-

chospasms, which is the reason for coughs. For some people, this inflammation can last anywhere from two weeks to two months, she explained.

While most causes of a persistent cough are mild and easily treated, a persistent cough is bothersome and can affect your quality of life. Getting prompt and effective treatment is advisable.

TCM experts recommend non-pharmaceutical methods to alleviate persistent coughing. One effective approach is point massage, specifically at the Tiantu and Hegu acupoints.

The Tiantu acupoint is located in the suprasternal fossa, just above the jugular notch. By gently pressing this acupoint with fingers, one can feel a refreshing sensation in the throat area, which helps to open the respiratory tract.

The Hegu acupoint massage, on the dorsum of the hand, between the 1st and 2nd metacarpal bones, can relieve asthma, eliminate heat toxicity, and alleviate symptoms of numbness, pain and fever.

For individuals who are prone to catching a cold and having a cough, moxibustion can be a helpful alternative. Moxa sticks, made from mugwort leaves, stimulate the acupoints to promote the activity of meridians, regulating the disrupted physiological functions of the body.

In addition, herbal fumigation is widely used in the treatment of symptoms such as fever, runny nose, and coughing. At home, one can use herbs like *Artemisia annua*, *Schizonepeta*, and *Artemisia argyi* to make infusions for bathing, which can help relieve symptoms like fever.

Warring States Period Bronze Lamp

Traditional Eastern Wisdom

By BI Weizi

A Warring States Period Qin tripod-shaped bronze lamp was unearthed in 1974 in Pingliang, Gansu province, an important part of the Silk Road. The lamp is now on display in the Gansu Provincial Museum because of its unique scientific and historic value.



A Warring States Period Qin tripod-shaped bronze lamp on display at Gansu Provincial Museum. (PHOTO: Gansu Provincial Museum)

The lamp has a diameter of 11.3 cm and a height of 16.7 cm when closed. It is in the shape of a tripod with three legs at the bottom, two duck-head-like ears facing each other on either side of the cap, keys on the tops of the ears, and an iron pillar in the middle.

To open the lamp, first turn the cap so that the two duck heads on the top cover face away from the double keys, then close the tops of the double keys, and use a "herringbone" shaped bracket to support the round tripod cover. The lamp panel will become a copper fuel lamp with a height of 30.2 cm.

When not in use, press down the double keys, rotate the double duck heads between the lids to lock them tightly, and close the tripod lid. Due to the exquisite design and craftsmanship, once closed, the seal is tight and the lamp oil stored in the tripod body will not leak out. It is rare that there is still muddy lamp oil in the tripod of a bronze lamp that is more than 2,000 years old.

This seemingly simple lamp not only has practical value, but also provides clues for historians to study the Silk Road. With digitalization empowering museums, visitors can now interact with this treasure through an electronic touch screen.