Prof. Dr. Liya Regel

Distinguished Research Professor of Engineering
(An internet search reveals no other woman with this title)
Honorary Degree of Doctor of Science
Professor, Electrical and Computer Engineering Department
Professor, Mechanical and Aeronautical Engineering Department
Founder and Director, International Center for Gravity Materials Science and Applications
Clarkson University, Potsdam, NY 13699-5700, USA
(1) 315-268-7672; lregel@clarkson.edu

Scientist, Engineer, Educator

Dr. Regel earned her Kandidat (Ph.D.) degree in Solid State Physics from Russia. (The Kandidat is equivalent to the Ph.D. in the U.S.) She was also awarded Russia's highest degree, the coveted Doctorat, for which there is no Western equivalent, in Physical and Mathematical Sciences.
The Doctorat is given to only a very small percentage of those with the Kandidat (see the last paragraph at *LLR*.) Indeed, she remains one of very few women to have received this recognition for work in solid state physics.
Among the more significant of her scientific research achievements are the following:

Discovered radiation-induced defects in compound semiconductors by high energy nuclear particles.

Pioneered research on high-energy, heavy-ion implantation in III-V semiconductors, magnetic semiconductors and rare-earth materials using the unique heavy-ion accelerators at the Joint Institute for Nuclear Research in Dubna, Russia.

Discovered a new phenomenon caused by thermo diffusion following heavy-ion implantation.

Pioneered research on centrifugal processing of materials and flow visualization, including the creation of several new types of apparatus and discovery of very surprising phenomena that excited the entire global materials community. Her results spurred related research activities around the world and a series of international meetings, several of these organized and chaired by her.

Succeeded in depositing crystalline diamond films from graphite and hydrogen at low pressure and moderate temperatures, including deposition on plastic, carbon, optical fibers glass, sapphire and metals (see *photos*.) This she accomplished in spite of predictions that it couldn't be done, particularly on plastic. Her discoveries and inventions led to patents for creative applications for space, medicine, and optoelectronics made possible by this deposition process.

Participated in more than 250 experiments in space; possibly the world record.

Professor Regel has taught and mentored students at all levels, both in Russia and in the USA.
Her former graduate students have become leaders of national science programs, professors, owners of their own companies, cosmonauts, and highly successful corporate scientists, engineers and managers.

Dr. Regel has made broad and significant contributions to the world's scientific and technical literature, including the following:

Sole author of 6 monographs, published in France, Russia, and UK.

Editor of 6 books and conference proceedings, appearing in English, French and Russian, Published over 290 papers.

Made over 600 presentations, including commencement and invited keynote addresses, plenary speeches, lectures and invited seminars.

Papers for many special occasions and international scientific meetings, universities and companies around the world.

In recognition of funding for her research from the National Science Foundation, the National Aeronautics and Space Administration, corporations, and individuals, she was elected a member of Clarkson University's prestigious Million Dollar Club.

Dr. Regel has served in many significant leadership positions in national and international organizations.
She chaired program and organizing committees for over 200 international and national scientific meetings.

In recent years, Dr. Regel founded and now directs the Distinguished Lectureship Series, *New Horizons in Engineering.* These highly successful events promote understanding of recent developments and trends in engineering for students, faculty and the local community.

Dr. Regel gives invited presentations on her own discoveries, including intriguing research results on centrifuges and in space; she presents popular public lectures on education in Science, Technology, Engineering, Art and Mathematics (STEAM) around the world. From 2000 to 2002 she appears to have been the first to point out in her lectures the connection between art and these other subjects, how science, technology, engineering and mathematics (STEM) enable developments in the arts, and how exposure to the arts can stimulate creativity in STEM. Dr. Regel has become a popular inspirational speaker on STEAM education and on important women's issues at international women's conferences and at universities.

She is the Founder and Chair of the Study Group "STEM/STEAM for Space. Grand Challenges" of the International Academy of Astronautics.

Selected Honors and Awards:
Honorary Degree of Doctor of Science from Alabama A&M University for her academic accomplishments in science and art (only woman scientist to receive this honor).
Honorary Degree of Doctor of Science from Clarkson University (only active faculty member to receive).
Elected Member of the International Academy of Astronautics (IAA).
IAA Basic Science Award (only woman to receive.)
Inspirational Role Model keynote lectures at International Women Congresses.
Plenary Lectures at a World Space Congress.
Crystal Globe Award, Links Incorporated, Greater Chapter of Huntsville, Alabama (African-American organization.)

Artist
While Dr. Regel's achievements in science and technology are very impressive, her accomplishments go far beyond that. She is often introduced to the audience before her lectures and events as a true renaissance woman whose every activity displays an exceptional creative power. In addition to being an internationally recognized scientist and engineer, she is an accomplished artist, music composer, author, inspiring speaker, and organizer of unique educational events.

As with all of her activities, Dr. Regel's art is highly creative. She has painted a wide variety of themes, ranging from classical folk tales, through illustrations of her own stories, to abstract paintings. While all of her creations are bright and cheerful, she has pioneered many techniques, such as use of tiny dots requiring a single-hair brush and magnifying glass to apply. She mixes her own colors, sometimes adding powdered gold and gems to produce unique paintings that change appearance depending on the direction and type of lighting. In addition to painting, she creates exquisite miniature outdoor scenes applying gems and minerals to canvas, polished jade and marble.

A few paintings from Professor Regel's series "Symphony of Colors" are shown via this *link*.

Dr. Regel's art has been exhibited in museums and galleries in Canada, Italy, Israel, France, Alabama, New York, Paris, Moscow, and more. Her paintings hang on permanent display in a museum, a church, universities and private collections. *Donations of art to Clarkson University*

Composer
In her university days, Dr. Regel had to make the difficult choice between physics and concert piano, at both of which she was equally adept. While she chose physics, she has maintained her interest in composing music and live improvisation, to the delight of friends, family, and larger audiences around the world. She includes her music and art (sound-image presentations) in STEAM lectures.

Author
In addition to all of her scientific books and papers, Dr. Regel finds time to write highly emotive poetry and fascinating short stories, in both Russian and English.