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Abstracts
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Editorial
Peter Stanchev

Key words: intro.

Abstract. This special double issue of *Serdica Journal of Computing* is dedicated to the 80$^\text{th}$ anniversary of the birthday of Professor Edward A. Friedman, internationally renowned scientist and innovative educator, versatile humanitarian, and member of our editorial board. On this occasion the Editorial Board entrusted Evgenia Sendova, a pioneer of the use of computers in education, with being editor-in-charge of this issue. In turn, she took care of inviting authors and reviewers whose expertise and experience are related to various aspects of Prof. Friedman's interests and activities.

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Professor Edward A. Friedman in a Nutshell

Key words: biography.

Abstract. Edward A. Friedman is Professor Emeritus of Technology Management at Stevens Institute of Technology. His undergraduate and doctoral degrees in Physics are from MIT (1957) and Columbia University (1963), respectively. As Dean of Stevens Institute of Technology (1973–1983) he led innovations on applications of computer and networking technologies in undergraduate education, which were studied and emulated by universities worldwide. From 1988 through 2004, as Founding Director of the Stevens Center for Innovation in Engineering and Science Education (CIESE), Prof. Friedman pioneered in the use of Internet resources in teaching mathematics and science in primary and secondary schools.

His awards and honors include a Pride of New Jersey Albert Einstein Medal for educational leadership (1992); Doctor of Science in Mathematics, Honoris Causa, Sofia University (2000). He is also a Foreign Fellow of the Union of Bulgarian Mathematicians.

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Bibliography of the Works of Professor Edward A. Friedman

Key words: bibliography.

Abstract. Prof. Edward A. Friedman's refereed papers in journals and conference proceedings, book chapters, invited articles/reviews, research reports, published teaching cases and other publications.

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Celebrating the 80th Anniversary of Professor Edward A. Friedman, Scientist and Educator

Evgenia Sendova

Key words: intro.

Abstract. On September 29, 2015, the doyen of the Editorial board of Serdica Journal of Computing, Prof. Edward Friedman, celebrated his 80th anniversary. This special issue is dedicated to the birthday boy in recognition of his numerous contributions: to science, to promoting effective strategies in integrating digital technologies with mathematics and science education, to adapting a software system for the health treatment of rural patients in India and Sub-Saharan Africa, and most recently—to the development of new university courses on raising the awareness of the threat of nuclear terrorism.

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Interviews with SIDNEY ALTMAN, VICTOR LAWRENCE, JAMES McCLELLAN and CHARLES FERGUSON

Key words: interview.

Abstract. Well-known scientists answer several questions related to Prof. Edward A. Friedman's activities and accomplishments:

Sidney Altman, Nobel Prize winner in chemistry in 1989 for his work on the catalytic properties of RNA;

Victor Lawrence, Distinguished Research Professor, Center for Intelligent Networked Systems at Stevens Institute of Technology;

James E. McClellan III, Professor Emeritus of History of Science, College of Arts and Letters, Stevens Institute of Technology;

Charles D. Ferguson, President of the Federation of American Scientists, the leading organization of scientists providing non-partisan information to the US government and public on nuclear weapons and other strategic issues.

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The Human Impact Factor in the Research and Development of Educational Software

Pavel Boytchev

Abstract. This paper presents the long-term impact factor which a single person may have on a researcher. This is a description of the author's research topics and the creation of educational software, which were either directly or indirectly affected by Prof. Edward Friedman.

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Extending the Class of Mathematical Problems Solvable in School

Petar S. Kenderov, Toni K. Chehlarova

Abstract. The problems of practical importance which are considered in school today necessarily have to lead to a mathematical model that can be solved by school mathematics knowledge. This includes systems of equations of at most second degree, some simple trigonometry and/or some basic geometry. This restricts severely the class of such problems and conveys the impression that mathematics is not applicable enough. We provide examples of problems related to practice which are difficult to solve by means of traditional school mathematics but are amenable for solving (at least with a certain precision) with the use of software systems dealing with mathematical problems. We also present the results of an experiment with such problems that were given to school students participating in the second round of the competition "VIVA Mathematics with Computer".

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Educating Mathematics and Science Students in Urban USA and Sub-Saharan Africa -- Lessons Learned and Future Challenges

Edward A. Friedman

Abstract. This essay focuses on the challenges of implementing effective mathematics and science programs in in secondary schools in urban America and Sub-Saharan Africa. A successful approach for meeting these challenges is considered which has first been introduced by the New Jersey Center for Teaching and Learning. This approach is based on maximizing the connections between mathematics and science, on developing an open-source software containing the entire curriculum and loading it into a SMART board computer. Integral to the methodology used is the presentation of questions with multiple choice answers. The technology implemented enables students to see the distribution of their answers (without seeing the correct one), and the teacher engages them in discussion and debates about the merits of various answers. The success of the educating-the-educators model supported by the implementation of the SMART system in both urban America and in The Gambia provides a model that can be replicated in diverse settings, and thus should be of interest to the world community of mathematics and science educators.

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On Learning in a Smart City Environment

Roumen Nikolov, Elena Shoikova, Milena Krumova, Eugenia Kovatcheva, Velian Dimitrov, Alexander Chikalanov

Abstract. Advances in technology in recent years have changed the learning behaviours of learners and reshaped teaching methods and learning environments. This paper overviews a foundational framework and provides models for planning and implementing smart learning environments. Gartner's 2015 Hype Cycle for Emerging Technologies identifies the computing innovations such as Internet of Things, Advanced Analytics, Machine Learning, Wearables, etc., that organisations should monitor. Learners and students, being the future drivers of these industries, are the main human resource to fulfil the vacancies of these work forces. Constant improvements and re-evaluation of the curriculum has to be done regularly to keep the learners up-to-date in meeting the requirements of these industries and corporations. Universities benefit from these thinking-outside-the-box practices by equipping students with work force experience that involves more hands-on tasks with real-life infrastructures. The introduction is focused on analysis of emerging industries and new types of jobs that require future personnel to be well equipped to meet the expansion requirements of these industries and keep up with their development needs. Section 2 looks at the future Internet domain landscape that comprises a great diversity of technology related topics involved in the implementation of Smart Learning Environments. The purpose of section 3 is to overview a foundational framework and major considerations for the planning and implementation of smart learning environments, behind which is the convergence of advances and developments in social constructivism, psychology, and technology. Section 4 introduces the smart learning models which are developed to reflect the dynamic knowledge conversion processes in technology enabled smart learning environments. The last section presents a case study of a learning scenario entitled "Monitoring the environmental parameters in a Smart City" as an illustration of experimental learning on Internet of Things, which proofs the power of the FORGE (Forging Online Education through FIRE) FP7 project methodology and infrastructure for building remote labs and delivering them to students.

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Vision for the Engagement of the e-Facilitator in School in the Inspiring Science Education Environment

Radoslav Yoshinov, Monka Kotseva

Abstract. The Inspiring Science Education project is all about elaborating a learning environment using an inquiry based learning (IBL) approach. The Inspiring Science Education portal as a main part of the environment is the place where a registered user can find (create) eLearning Tools and digital educational resources, which can be used in class and as a place to connect with like-minded teachers and schools around Europe to share experiences and collaborate on projects. On the other hand, starting from 2009 in various EU countries, including Bulgaria, research was done to describe and categorize the professional profile of the e-facilitator, carrier of the mission to overcome digital divide between the generations, through implementing ICT knowledge. Our team worked on the requirements and explored the need for an e-facilitator in school as a major ICT expert and consultant, who empowers access to the electronic services in the e-education space, facilitates links with virtual libraries, acts as initiator and architect of social communication by forming communities involving all participants in the learning process—students, teachers, parents, administration, etc. This paper expresses the author's projection of the roles and functionalities of the e-facilitator in school in the Inspiring Science Education environment.

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Combinatorial Computations on an Extension of a Problem by Pál Turán

Petar Gaydarov, Konstantin Delchev

Abstract. Turán's problem asks what is the maximal distance from a polynomial to the set of all irreducible polynomials over $\mathbb{Z}$. It turns out it is sufficient to consider the problem in the setting of $\mathbb{F}_2$. Even though it is conjectured that there exists an absolute constant C such that the distance $L(f - g) \leq C$, the problem remains open. Thus it attracts different approaches, one of which belongs to Lee, Ruskey and Williams, who study what the probability is for a set of polynomials 'resembling' the irreducibles to satisfy this conjecture. In the following article we strive to provide more precision and detail to their method, and propose a table with better numeric results.

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Supporting the Bulgarian Young Talent in the Field of Informatics

Petya Asenova

Abstract. In this paper I share some impressions from my short communication with an exceptional person—Professor Edward Friedman from Stevens University of Technology, USA. Working in the field of integrating ICT in education in the early 1990s, he launched several joint projects with Bulgarian educators. The essentials of these activities were real projects in the school. This idea was recently implemented at the university level as well in the context of IT. I discuss this matter in the final sections of the paper.

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Information Society for Enlightened Voting

Solomon Passy

Abstract. Among the millions of words uttered and written on the subject of democracy, Winston Churchill's are among the most famous: "Democracy is the worst form of government except all those other forms that have been tried from time to time." The occasion of the remark – it was made on 11 November 1947, when the great wartime leader spoke for the opposition in Britain's House of Commons – is a reminder of how far the world has since travelled. Yet the passing of six decades notwithstanding, mankind is still subservient to the classical dogma embodied in Churchill's phrase: that democracy is synonymous with universal suffrage.
It was always open to question. But today, new and evolving technologies enable us to discard it – not to abolish democracy (who would want to do that?), but to enrich democracy with more effective, more innovative and more moral forms of enlightened government across the world.

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Edison and St. Cyril: Seeking Common Ground. Presentation at Honorary Degree Award Ceremony

Edward A. Friedman

Abstract. Can Bulgaria absorb some of the entrepreneurial, pragmatic magic of American society that leads to new productive enterprise? Can America come to value more deeply

the Humanistic traditions exemplified in the culture of Bulgaria? The credo of an optimist: civilization, despite its setbacks, continues to improve.

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