9Florentin Smarandache

polymath, professor of mathematics

University of New Mexico, 705 Gurley Ave., Gallup, New Mexico 87301, USA

E-mail: fsmarandache@gmail.com

Personal web page: http://fs.gallup.unm.edu/

Scientist and writer. Wrote in three languages: Romanian, French, and English.

He did post-doctoral researches at Okayama University of Science (Japan) between 12 December 2013 - 12 January 2014; at Guangdong University of Technology (Guangzhou, China), 19 May - 14 August 2012; at ENSIETA (National Superior School of Engineers and Study of Armament), Brest, France, 15 May - 22 July 2010; and for two months, June-July 2009, at Air Force Research Laboratory in Rome, NY, USA (under State University of New York Institute of Technology).

Graduated from the Department of Mathematics and Computer Science at the University of Craiova in 1979 first of his class graduates, earned a Ph. D. in Mathematics from the State University Moldova at Kishinev in 1997, and continued postdoctoral studies at various American Universities such as University of Texas at Austin, University of Phoenix, etc. after emigration.

In U.S. he worked as a software engineer for Honeywell (1990-1995), adjunct professor for Pima Community College (1995-1997), in 1997 Assistant Professor at the University of New Mexico, Gallup Campus, promoted to Associate Professor of Mathematics in 2003, and to Full Professor in 2008.
Between 2007-2009 he was the Chair of Math & Sciences Department.

In mathematics he introduced the degree of negation of an axiom or theorem in geometry (see the Smarandache geometries which can be partially Euclidean and partially non-Euclidean, 1969, http://fs.gallup.unm.edu/Geometries.htm), the multi-structure (see the Smarandache n-structures, where a weak structure contains an island of a stronger structure, http://fs.gallup.unm.edu/Algebra.htm), and multi-space (a combination of heterogeneous spaces) [http://fs.gallup.unm.edu/Multispace.htm].
He created and studied in number theory many:
sequences (http://mathworld.wolfram.com/SmarandacheSequences.html, http://mathworld.wolfram.com/ConsecutiveNumberSequences.html),
functions (http://mathworld.wolfram.com/SmarandacheFunction.html,

http://mathworld.wolfram.com/SmarandacheCeilFunction.html,
http://mathworld.wolfram.com/Smarandache-KurepaFunction.html,
http://mathworld.wolfram.com/Smarandache-WagstaffFunction.html,
http://mathworld.wolfram.com/SmarandacheNear-to-PrimorialFunction.html,
http://mathworld.wolfram.com/PseudosmarandacheFunction.html),
numbers (http://mathworld.wolfram.com/SmarandacheNumber.html,
http://mathworld.wolfram.com/Smarandache-WellinNumber.html),
prime numbers (http://mathworld.wolfram.com/SmarandachePrime.html,
http://mathworld.wolfram.com/Smarandache-WellinPrime.html),
and constants (http://mathworld.wolfram.com/SmarandacheConstants.html).

He generalized [1995] the fuzzy, intuitive, paraconsistent, multi-valent, dialetheist logics to the 'neutrosophic logic' (also in the Denis Howe's Dictionary of Computing, England) and, similarly, he generalized the fuzzy set to the 'neutrosophic set' (and its derivatives: 'paraconsistent set', 'intuitionistic set', 'dialethist set', 'paradoxist set', 'tautological set') [http://fs.gallup.unm.edu/ebook-neutrosophics6.pdf].

He coined the words "neutrosophy" [(French *neutre*< Latin *neuter,* neutral, and Greek *sophia,* skill/wisdom) means knowledge of neutral thought] and its derivatives: neutrosophic, neutrosophication, neutrosophicator, deneutrosophication, deneutrosophicator, etc.

In 2003 together with W. B. Vasantha Kandasamy he introduced the Neutrosophic Algebraic Structures, based on sets of Neutrosophic Numbers [i.e. numbers of the form a+bI, where a, b are real or complex numbers, and I = Indeterminacy, with I^n = I for n positive non-null integer, 0I = I, I/I = undefined, and nI+mI = (n+m)I].

In 2006 he introduced the degree of dependence/independence between the neutrosophic components T, I, F.
In 2007 he extended the neutrosophic set *to Neutrosophic Overset (when some neutrosophic component is > 1), and to Neutrosophic Underset (when some neutrosophic component is < 0), and to Neutrosophic Offset (when some neutrosophic components are off the interval [0, 1], i.e. some neutrosophic component > 1 and some neutrosophic component < 0). Then, similar extensions to respectively Neutrosophic Over/Under/Off Logic, Measure, Probability, Statistics etc.*http://fs.gallup.unm.edu/NeutrosophicOversetUndersetOffset.pdf

Then, introduced the NeutrosophicTripolar Set and Neutrosophic Multipolar Set, also the NeutrosophicTripolar Graph and Neutrosophic Multipolar Graph.

He then generalized the Neutrosophic Logic/Set/Probability to <u>Refined</u> Neutrosophic Logic/Set/Probability [2013], where T can be split into subcomponents $T_1, T_2, ..., T_p$, and I into $I_1, I_2, ..., I_r$, and F into $F_1, F_2, ..., F_s$, where p+r+s = n ≥ 1. Even more: T, I, and/or F (or any of their subcomponents T_j ,I_k, and/or F_l) could be countable or uncountable infinite sets.

In 2015 he refined the indeterminacy "*I*", within the neutrosophic algebraic structures, into different types of indeterminacies (depending on the problem to solve), such as I_1, I_2, , I_p with integer $p \geq 1$, and obtained the *refined neutrosophic numbers* of the form $N_p = a + b_1 I_1 + b_2 I_2 + + b_p I_p$ where a, b_1, b_2, , b_p are real or complex numbers, and a is called the <u>determinate part</u> of N_p, while for each k in $\{1, 2, , p\} I_k$ is called the <u>k-th indeterminate part</u> of N_p.

Then consequently he extended the neutrosophic algebraic structures to Refined Neutrosophic Algebraic Structures [or Refined Neutrosophic I-Algebraic Structures] (2015), which are algebraic structures based on sets of the refined neutrosophic numbers $a + b_1 I_1 + b_2 I_2 + + b_p I_p$.

He introduced the (T, I, F)-Neutrosophic Structures [2015]. In any field of knowledge, each structure is composed from two parts: a space, and a set of axioms (or laws) acting (governing) on it. If the space, or at least one of its axioms (laws), has some indeterminacy, that structure is a *(T, I, F)*-Neutrosophic Structure. And he extended them to the *(T, I, F)-Neutrosophic I-Algebraic Structures* [2015], i.e. algebraic structures based on neutrosophic numbers of the form *a+bI*, but also having indeterminacy related to the structure space (elements which only partially belong to the space, or elements we know nothing if they belong to the space or not) or indeterminacy related to at least an axiom (or law) acting on the structure space. Then he extended them to *Refined (T, I, F)-Neutrosophic Refined I-Algebraic Structures*.

Also, he proposed an extension of the classical probability and the imprecise probability to the 'neutrosophic probability' [1995], that he defined as a tridimensional vector whose components are real subsets of the non-standard interval]-0, 1+[, introduced the neutrosophic measure and neutrosophic integral [http://fs.gallup.unm.edu/NeutrosophicMeasureIntegralProbability.pdf], and also extended the classical statistics to neutrosophic statistics [http://fs.gallup.unm.edu/NeutrosophicStatistics.pdf].

Since 2002, together with Dr. Jean Dezert from Office National de RecherchesAeronautiques in Paris, worked in information fusion and generalized the Dempster-Shafer Theory to a new theory of plausible and paradoxist fusion (Dezert-Smarandache Theory): http://fs.gallup.unm.edu/DSmT.htm .
In 2004 he designed an algorithm for the Unification of Fusion Theories and rules (UFT) used in bioinformatics, robotics, military.

In biology he introduced in 2017 the Theory of Neutrosophic Evolution: Degrees of Evolution, Indeterminacy, and Involution [http://fs.gallup.unm.edu/neutrosophic-evolution-PP-49-13.pdf].

In physics he found a series of paradoxes (see the quantum smarandache paradoxes), and considered the possibility of a third form of matter, called unmatter [2004], which is a combination of matter and antimatter - presented at

Caltech (American Physical Society Annual Meeting, 2010) and Institute of Atomic Physics (Magurele, Romania 2011).

Based on a 1972 manuscript, when he was a student in Rm. Valcea, he published in 1982 the hypothesis that 'there is no speed barrier in the universe and one can construct any speed', (http://scienceworld.wolfram.com/physics/SmarandacheHypothesis.html). This hypothesis was partially validated on September 22, 2011, when researchers at CERN experimentally proved that the muon neutrino particles travel with a speed greater than the speed of light.
Upon his hypothesis he proposed an Absolute Theory of Relativity [free of time dilation, space contraction, relativistic simultaneities and relativistic paradoxes which look alike science fiction not fact]. Then he extended his research to a more diversified Parameterized Special Theory of Relativity (1982): http://fs.gallup.unm.edu/ParameterizedSTR.pdf and generalized the Lorentz Contraction Factor to the Oblique-Contraction Factor for lengths moving at an oblique angle with respect to the motion direction, then he found the Angle-Distortion Equations (1983): http://fs.gallup.unm.edu/NewRelativisticParadoxes.pdf .
He considered that the speed of light in vacuum is variable, depending on the moving reference frame; that space and time are separated entities; also the redshift and blueshift are not entirely due to the Doppler Effect, but also to the Medium Gradient and Refraction Index (which are determined by the medium composition: i.e. its physical elements, fields, density, heterogeneity, properties, etc.); and that the space is not curved and the light near massive cosmic bodies bends not because of the gravity only as the General Theory of Relativity asserts (Gravitational Lensing), but because of the Medium Lensing.
In order to make the distinction between clock and time, he suggested a *first experiment* with different clock types for the GPS clocks, for proving that the resulted dilation and contraction factors are different from those obtained with the cesium atomic clock; and a *second experiment* with different medium compositions for proving that different degrees of redshifts/blushifts and different degrees of medium lensing would result.

He introduced the superluminal and instantaneous physics (domains that study the physical laws at superluminal and respectively instantaneous velocities), and the neutrosophic physics that describes collections of objects or states that are individually characterized by opposite properties, or are characterized neither by a property nor by the opposite of the property. Such objects or states are called neutrosophic entities.

In philosophy he introduced in 1995 the 'neutrosophy', as a generalization of Hegel's dialectic, which is the basement of his researches in mathematics and economics, such as 'neutrosophic logic', 'neutrosophic set', 'neutrosophic probability', 'neutrosophic statistics'.
Neutrosophy is a new branch of philosophy that studies the origin, nature, and

scope of neutralities, as well as their interactions with different ideational spectra. This theory considers every notion or idea <A> together with its opposite or negation <Anti-A> and the spectrum of "neutralities" <Neut-A> (i.e. notions or ideas located between the two extremes, supporting neither <A> nor <Anti-A>). The <Neut-A> and <Anti-A> ideas together are referred to as <Non-A>. According to this theory every idea <A> tends to be neutralized and balanced by <Anti-A> and <Non-A> ideas - as a state of equilibrium. As a consequence, he generalized the triad thesis-antithesis-synthesis to the tetrad thesis-antithesis-neutrothesis-neutrosynthesis[http://fs.gallup.unm.edu/neutrosophy.htm].

He extended the Lupasco-Nicolescu s *Law ofIncluded Middle* [<A>, <nonA>, and a third value <T> which resolves their contradiction at another level of reality] to the *Law of Included Multiple-Middle* [<A>, <antiA>, and <neutA>, where <neutA> is split into a multitude of neutralities between <A> and <antiA>, such as $<neut_1A>$, $<neut_2A>$, etc.]. The <neutA> value (i.e. neutrality or indeterminacy related to <A>) actually comprises the included middle value. Also, he extended the *Principle of Dynamic Opposition* [opposition between <A> and <antiA>] to the *Principle of Dynamic Neutrosophic Opposition* [which means oppositions among <A>, <antiA>, and <neutA>]; [http://fs.gallup.unm.edu/LawIncludedMultiple-MIddle.pdf].

Other small contributions he had in psychology [http://fs.gallup.unm.edu/psychology.htm], and in sociology [http://fs.gallup.unm.edu/sociology.htm].

Invited to lecture at University of Berkeley (2003), NASA Langley Research Center-USA (2004), NATO Advance Study Institute-Bulgaria (2005), Jadavpur University-India (2004), Institute of Theoretical and Experimental Biophysics-Russia (2005), Bloomsburg University-USA (1995), University Sekolah Tinggi Informatika&Komputer Indonesia-Malang and University Kristen Satya WacanaSalatiga-Indonesia (2006), Minufiya University (ShebinElkom)-Egypt (2007), Air Force Institute of Technology Wright-Patterson AFB in Dayton [Ohio, USA] (2009), Universitatea din Craiova - Facultatea de Mecanica [Romania] (2009), Air Force Research Lab &Griffiss Institute [Rome, NY, USA] (2009), COGIS 2009 (Paris, France), ENSIETA (Brest, Franta) - 2010, Romanian Academy - Institute of Solid Mechanics and Commission of Acoustics (Bucharest - 2011), Guangdong University of Technology (Guangzhou, China) - 2012, Okayama University of Sciences (Japan) - 2013, Osaka University (Japan) - 2014, Universidad Nacional de Quilmes (Argentina) - 2014, Universidad

Complutense de Madrid (Spain) - 2014, Univ. Transilvania Brasov - 2015; Vietnam National University, Le Quy Don Technical University (Hanoi) and Hanoi University, also Ho Chi Minh City University of Technology (HUTECH) and Nguyen Tat Thanh University (Ho Chi Minh City) - 2016, Universidad de Guayaquil (Ecuador) - 2016 etc. Presented papers at many Sensor or Information Fusion International Conferences {Australia - 2003, Sweden - 2004, USA (Philadelphia - 2005, Seattle - 2009, Chicago - 2011, Washington DC - 2015), Spain (Barcelona - 2005, Salamanca - 2014), Italy - 2006, Belgium - 2007, Canada -2007, Germany (Cologne - 2008, Heidelberg - 2016), Scotland- 2010, Singapore - 2012, Turkey - 2013}.

Presented papers at IEEE GrComp International Conferences (Georgia State University at Atlanta - 2006, Kaohsiung National University in Taiwan - 2011), International Conference on Advanced Mechatronic Systems (Tokyo University of Agriculture and Technology, Japan) - 2012, IEEE World Congress on Computational Intelligence (Vancouver, Canada, 2016).

He received the 2011 Romanian Academy "TraianVuia" Award for Technical Science (the highest in the country); *Doctor Honoris Causa* of Academia DacoRomana from Bucharest - 2011, and *Doctor Honoris Causa* of Beijing Jiaotong University (one of the highest technical universities of China) - 2011; the 2012 New Mexico - Arizona Book Award & 2011 New Mexico Book Award at the category Science & Math (for Algebraic Structures, together with Dr. W. B. Vasantha Kandasamy) on 18 November 2011 in Albuquerque; also, the Gold Medal from the Telesio-Galilei Academy of Science from England in 2010 at the University of Pecs - Hungary (for the Smarandache Hypothesis in physics, and for the Neutrosophic Logic), and the Outstanding Professional Service and Scholarship from The University of New Mexico - Gallup (2009, 2005, 2001).

Very prolific, he is the author, co-author, editor, and co-editor of 180 books published by about forty publishing houses (such as university and college presses, professional scientific and literary presses, such as Springer Verlag (in print), Univ. of Kishinev Press, Pima College Press, ZayuPress, Haiku, etc.) in ten countries and in many languages, and 250 scientific articles and notes, and contributed to over 100 literary and 50 scientific journals from around the world.

He published many articles on international journals, such as: Multiple-Valued Logic - An International Journal (now called Multiple-Valued Logic & Soft Computing), International Journal of Social Economics, International Journal of Applied Mathematics, International Journal of Tomography & Statistics, Applied Physics Research (Toronto), Far East Journal of Theoretical Statistics, International Journal of Applied Mathematics and Statistics (Editor-in-Chief), GacetaMatematica (Spain), Humanistic Mathematics Network Journal, Bulletin of

Pure and Applied Sciences, Progress in Physics, Infinite Energy (USA), Information & Security: An International Journal, InterStat - Statistics on the Internet (Virginia Polytechnic Institute and State University, Blacksburg, USA), American Mathematical Monthly, Mathematics Magazine, Journal of Advances in Information Fusion (JAIF), Zentralblatt f r Mathematik (Germany; reviewer), NieuwArchiefvoorWiskunde (Holland), Advances in Fuzzy Sets and Systems, Advances and Applications in Statistics, Critical Review (Society for Mathematics of Uncertainty, Creighton University - USA), Bulletin of Statistics & Economics, International Journal of Artificial Intelligence, Fuzzy Sets and Systems, Journal of Computer Science and Technology, The Icfai University Journal of Physics (India), Hadronic Journal (USA), Intelligencer (G ttingen, Germany), Notices of the American Mathematical Society, etc. and on many International Conference Proceedings.
Some of them can be downloaded from the LANL / Cornell University (http://arXiv.org/find) and the CERN web sites.

During the Ceausescu's era he got in conflict with authorities. In 1986 he did the hunger strike for being refused to attend the International Congress of Mathematicians at the University of Berkeley, then published a letter in the Notices of the American Mathematical Society for the freedom of circulating of scientists, and became a dissident. As a consequence, he remained unemployed for almost two years, living from private tutoring done to students. The Swedish Royal Academy Foreign Secretary Dr. Olof G. Tandberg contacted him by telephone from Bucharest.
Not being allowed to publish, he tried to get his manuscripts out of the country through the French School of Bucharest and tourists, but for many of them he lost track.
Escaped from Romania in September 1988 and waited almost two years in the political refugee camps of Turkey, where he did unskilled works in construction in order to survive: scavenger, house painter, whetstoner. Here he kept in touch with the French Cultural Institutes that facilitated him the access to books and rencontres with personalities.
Before leaving the country he buried some of his manuscripts in a metal box in his parents vineyard, near a peach tree, that he retrieved four years later, after the 1989 Revolution, when he returned for the first time to his native country. Other manuscripts, that he tried to mail to a translator in France, were confiscated by the secret police and never returned.

He wrote hundreds of pages of diary about his life in the Romanian dictatorship (unpublished), as a cooperative teacher in Morocco ("Professor in Africa", 1999), in the Turkish refugee camp ("Escaped... / Diary From the Refugee Camp", Vol. I, II, 1994, 1998), and in the American exile - diary which is still going on.

But he's internationally known as the literary school leader for the "paradoxism" movement which has many advocates in the world, that he set up in 1980, based on an excessive use of antitheses, antinomies, contradictions, paradoxes (

http://mathworld.wolfram.com/SmarandacheParadox.html)in creation - both at the small level and the entire level of the work - making an interesting connection between mathematics, philosophy, and literature [http://fs.gallup.unm.edu/a/paradoxism.htm].
He introduced the 'paradoxist distich', 'tautologic distich', and 'dualistic distich', 'paradoxist quatrain' etc. inspired from the mathematical logic

[http://fs.gallup.unm.edu/a/literature.htm].
Literary experiments he realized in his dramas: Country of the Animals, where there is no dialogue!, and An Upside-Down World, where the scenes are permuted to give birth to one billion of billions of distinct dramas!
[http://fs.gallup.unm.edu/a/theatre.htm].
He stated:
"Paradoxism started as an anti-totalitarian protest against a closed society, where the whole culture was manipulated by a small group. Only their ideas and publications counted. We couldn't publish almost anything.
Then, I said: Let's do literature... without doing literature! Let's write... without actually writing anything. How? Simply: literature-object! 'The flight of a bird', for example, represents a "natural poem", that is not necessary to write down, being more palpable and perceptible in any language that some signs laid on the paper, which, in fact, represent an "artificial poem": deformed, resulted from a translation by the observant of the observed, and by translation one falsifies. Therefore, a mute protest we did!
Later, I based it on contradictions. Why? Because we lived in that society a double life: an official one - propagated by the political system, and another one real. In mass-media it was promulgated that 'our life is wonderful', but in reality 'our life was miserable'. The paradox flourishing! And then we took the creation in derision, in inverse sense, in a syncretic way. Thus the paradoxism was born. The folk jokes, at great fashion in Ceausescu's 'Epoch', as an intellectual breathing, were superb springs.
The "No" and "Anti" from my paradoxist manifestos had a creative character, not at all nihilistic." Paradoxism, following the line of Dadaism, Lettrism, absurd theater, is a kind of up-side down writings!
In 1992 he was invited speaker in Brazil (Universidad do Blumenau, etc.).

He did many poetical experiments within his avant-garde and published paradoxist manifestos: "Le Sens du Non-Sens" (1983), "Anti-chambres/Antiposies/Bizarreries" (1984, 1989), "NonPoems" (1990), changing the French and respectively English linguistics clich s. While "Paradoxist Distiches" (1998) introduces new species of poetry with fixed form.
Eventually he edited three International Anthologies on Paradoxism (2000-2004) with texts from about 350 writers from around the world in many languages.

"MetaHistory" (1993) is a theatrical trilogy against the totalitarianism again, with dramas that experiment towards a total theater: "Formation of the New Man", "An Upside - Down World", "The Country of the Animals". The last drama, that pioneers

no dialogue on the stage, was awarded at the International Theatrical Festival of Casablanca (1995).
He translated them into English as "A Trilogy in pARadOXisM: avant-garde political dramas"; and they were published by ZayuPress (2004).
"Trickster's Famous Deeds" (1994, auto-translated into English 2000), theatrical trilogy for children, mixes the Romanian folk tradition with modern and SF situations.

His first novel is called "NonNovel" (1993) and satirizes the dictatorship in a gloomy way, by various styles and artifice within one same style.

"Faulty Writings" (1997) is a collection of short stories and prose within paradoxism, bringing hybrid elements from rebus and science into literature.

His experimental albums "Outer-Art" (Vol. I, 2000 & Vol. II: The Worst Possible Art in the World!, 2003) comprises over-paintings, non-paintings, anti-drawings, super-photos, foreseen with a manifesto: "Ultra-Modernism?" and "Anti-manifesto" [http://fs.gallup.unm.edu/a/oUTER-aRT.htm].
Art was for Dr. Smarandache a hobby. He did:
- graphic arts for his published volumes of verse: "Anti-chambres/ Anti-posies/ Bizarreries" (mechanical drawings), "NonPoems" (paradoxist drawings), "Dark Snow" & "Circles of light" (covers);
- paradoxist collages for the "Anthology of the Paradoxist Literary Movement", by J. -M. Levenard, I. Rotaru, A. Skemer;
- covers and illustrations of books, published by "Dorul" Publ. Hse., Aalborg, Denmark;
- illustrations in the journal: "Dorul" (Aalborg, Denmark).
Many of his art works are held in "The Florentin Smarandache Papers" Special Collections at the Arizona State University, Tempe, and Texas State University, Austin (USA), also in the National Archives of Valcea and Romanian Literary Museum (Romania), and in the Musee de Bergerac (France).

Twelve books were published that analyze his literary creation, among them: "Paradoxism's Aesthetics" by TituPopescu (1995), and "Paradoxism and Postmodernism" by Ion Soare (2000).
He was nominated by the Academia DacoRomana from Bucharest for the 2011 Nobel Prize in Literature for his 75 published literary books.

Hundreds of articles, books, and reviews have been written about his activity around the world. The books can be downloaded from this
Digital Library of Science: http://fs.gallup.unm.edu/ScienceLibrary.htm
and from the Digital Library of Arts and Letters:
http://fs.gallup.unm.edu/LiteratureLibrary.htm .

As a Globe Trekker he visited 52 countries that he wrote about in his memories. In

2015 he went to an expedition in Antarctica (see his Photo Gallery at:<u>http://fs.gallup.unm.edu/photo/GlobeTrekker.html</u> **).**

International Conferences:
First International Conference on Smarandache Type Notions in Number Theory, August 21-24, 1997, organized by Dr. C. Dumitrescu& Dr. V. Seleacu, University of Craiova, Romania.
International Conference on Smarandache Geometries, May 3-5 2003, organized by Dr. M. Khoshnevisan, Griffith University, Gold Coast Campus, Queensland, Australia.
International Conference on Smarandache Algebraic Structures, December 17-19, 2004, organized by Prof. M. Mary John, Mathematics Department Chair, Loyola College, Madras, Chennai - 600 034 Tamil Nadu, India.

[Presentation by Dmitri Rabounski]