

Citizenship: U.S.A. (naturalized American since 1988)

Education:

Ph.D. & Doctorat d'Etat ès Sciences (Mathematics), 'Summa Cum Laude', Université Pierre et Marie Curie (Paris VI), France, 1980 & 1986. Habilitation to Direct Research (Paris VI), 1987.

Experience:

Professor, University of California, Riverside, 1990-
· Member, Mathematical Sciences Research Institute (MSRI), Berkeley, Spring 1999 and Spring 2001 & Institut Henri Poincaré (IHP), Paris, Spring 2003.
· Member of the Newton Institute for Mathematical Sciences, Cambridge University, UK, (part of) Spring 1999
· Member, Institut des Hautes Etudes Scientifiques (IHES), Bures-sur-Yvette, France, 1994-95 and for several parts of 1995-98
· Visiting Professor, Yale University, New Haven, 1990-91
· Associate Professor, University of Georgia, Athens, 1986-90
· Visiting Assistant Professor, University of Iowa, Iowa City, 1985-86
· Member, Mathematical Sciences Research Institute (MSRI), Berkeley, 1984-85
· Assistant Professor, University of Southern California, Los Angeles, 1980-85
· Research Associate, University of California, Berkeley, 1979-80
· Research Associate, Université Paris VI, France, 1978-80

Fellowships, Awards and Honors:

Research Fellowship D.G.R.S.T., Université Paris VI, 1978-80; George Lury Fellowship, University of California, Berkeley, 1979-80; My research on "Spectral and Fractal Geometry" was one of the two mathematical works presented by NSF to the "Office of the President" and to the U.S. Congress in the "National Science Foundation 1990 Fiscal Year Budget Proposal to Congress". Award of a university-wide "Creative Research Medal", Univ. of Georgia, Athens, 1989; Recipient of the M. G. Michael Award for Excellence in Research, Univ. of Georgia, Athens, 1989; Honorary Member, Research Board of Advisors, American Biography Institute (ABI), 1997-; Twentieth Century Award for Achievement, International Biographical Institute (IBC), Cambridge, UK, 1998; Outstanding Man of the 20th Century, ABI, 1999; nomin. "100 Geniuses of the 21st Century" (IBC, 2006). Elected Fellow of the American Association for the Advancement of Science (AAAS), Sept. 2000 [for "*Distinguished Research Contributions to Mathematical Physics and Fractal Geometry*"]; Member, AMS Council, and Associate Secretary of the American Mathematical Society (AMS), Western Section, Feb. 2002-. (Renominated and reconfirmed four times, now through Jan. 2012.) Nominated for membership in the American Academy of Arts and Sciences, 2003-04 & 2006-07.

Discussion in the general scientific press of my (joint) work on the "vibrations of fractal drums" and "the Weyl-Berry conjecture". Please see the articles by Ian Stewart in *Nature* (vol. 333, 5/19/88), Jean-Pierre Fabre in *La Recherche* (vol. 202, 9/88), Barry Cipra in *Science* (vol. 259, 2/12/93), as well as the cover article by Ivars Peterson in *Science News* (vol. 146, No. 12, 9/17/94) and the book by the same author, entitled "*The Jungles of Randomness: A Mathematical Safari*" (Wiley, 1998). Also see the article by Ian Stewart in *New Scientist* (vol. 156, 12/20/97), the article in *La Recherche* (vol. 383, 2/05), and the recent article by Barry Cipra in *Science* (2/13/09).

Research Areas:

Mathematical Physics, Functional and Harmonic Analysis, Geometric Analysis, Partial Differential Equations (PDEs), Dynamical Systems, Spectral Geometry, Fractal Geometry; Connections with Number Theory, Arithmetic Geometry and Noncommutative Geometry.

Current Research Projects: Mathematical Theory of Feynman Path Integrals; Vibrations of Fractal Drums; Analysis and PDEs On or Off Fractals; Waves and Diffusions in Fractal Media; Origins and Formation of Fractal Structures in Nature; Noncommutative Fractal Geometry; Analogues of Dirac Operators and Geodesics on Self-Similar Fractals and Trees; Fractal Strings and Membranes; Theory of Complex Fractal Dimensions; Analogues in the p-adic and Adelic Realms; Fractal Curvatures and Cohomology; Modular Flows on Moduli Spaces of Fractal Membranes; Noncommutative Flows of Zeros and Zeta Functions; Connections with the Riemann Zeta Function and the Riemann Hypothesis. Ihara Zeta Functions on Infinite Periodic or Self-Similar Graphs.

Research Grants (over the last twenty years): National Science Foundation Research Grants, DMS-8703138 (6/87- 6/89), DMS-8904389 (6/89-6/92), DMS-9207098 (7/92-7/96), DMS-9623002 (9/96-8/99), and DMS-0070497 (7/00-7/05), and (current) DMS-0707524. (Sole P.I.)

Selected Invited Talks (over the last two years):

- (a) **Plenary Speaker:** Workshop on "*Mathematics of Schrödinger Operators, with Applications to Path Integrals*" (Goa, India, 12/03)*. CMLA Annual Analysis Conf. (ENS Cachan, Paris, 5/04). 5th European Conf. on "*Elliptic and Parabolic Problems: A Special Tribute to the Work of Haim Brezis*" (Gaeta, Italy, 6/04). Internat. Conf. on "*Physics of Irregular Systems*" (Brazil, Fortaleza, 8/04) *. 2nd Conf. on "*Analysis and Probability on Fractals*" (Cornell Univ., Ithaca, 6/05). Internat. Workshop on "*Fractal Analysis*" (Eisenach, Germany, 9/05). Workshop on "*Traces in Geometry, Number Theory and Quantum Fields*" (Max-Planck Inst., Bonn, Germany, 10/05). Conf. on "*Feynman Integrals in Mathematics and Physics*:" (Lincoln, 5/06). EMS School on "*Arithmetic and Geometry Around Quantization*" (Istanbul, Turkey, 6/06). Sympos. on "*Contemporary Problems of Mathematical Analysis and Mathematical Physics*" (Taormina, Italy, 6/06). Internat. Conf. on "*Analysis on Fractals*" (Kyoto, Japan, 9/06) *. Internat. Conf. on "*Zeta Functions*" (Moscow, Russia, 9/06). Interdisc. Conf. on "*Heat Kernels in Mathematics and Physics*" (Ulm, Germany, 11/06)*. *To take place:* Workshop on "*Geometric Measure Theoretic Approaches to Potential Theory on Fractals and Manifolds*" (Oberwolfach, Germany, 03/07). Conf. on "*Variational and Topological Methods, Applications and Simulations*" (Flagstaff, 05/07). Workshop on "*Analysis on Graphs and Fractals*" (Newton Inst., Cambridge and Cardiff, UK, 5-6/07)
- (b) **Invited Speaker, Mini-Symposia/Special Sessions:** First Joint Mtg. French/Nordic Math. Soc., Sp. Session on "*Spectral Geometry*" (Reykjavik, Iceland, 1/05) *. ISAAC Sp. Session on "*Elliptic and Parabolic Nonlinear Problems*" (Catania, Italy, 7/05). "*Einstein Century*" Internat. Sympos., Sp. Session on "*Gravitation and Nature of Spacetime*" (Paris, France, 7/05). AMS Sp. Session on "*Fractal Geometry in Analysis, Mathematical Physics, Number Theory and Dynamical Systems*" (San Francisco, 5/06). Conf. on "*Topology*", Sp. Session on "*Fractals and Tilings*" (GA, 7/06) *. AMS Sp. Session on "*Analysis and Probability on Fractals*" (Storrs, 9/06). *To take place:* German Math. Soc. Annual Meeting, Sp. Session on "*Geometry of Random Fractals*" (Berlin, 3/07)
- (c) **Invited Participant:** Research Programs on "*Spectral Invariants*" (MSRI, Berkeley, 3-6/01) and on "*Noncommutative Geometry and K-Theory*" (Inst. Henri Poincaré (IHP), Paris, 3-7/04), and (to take place) on "*Analysis on Graphs and Fractals*" (Newton Inst., Cambridge & Cardiff Univ., UK, 5-6/07).

B. Recent Research Books and Memoirs: [\[1\]](#)

1. "*Generalized Minkowski content, spectrum of fractal drums, fractal strings and the Riemann zeta function.*", (with C. He). *Memoirs Amer. Math. Soc.*, No. 608, **127** (1997), 1-97.
2. "*The Feynman Integral and Feynman's Operational Calculus*". Oxford Mathematical Monographs, Oxford Univ. Press, Oxford and New York, 2000, approx. 800 pp. (precisely, 771+(xviii) pp.), (with G. W. Johnson). (Paperback edition: 2002, OUP). [Refereed research monograph.]
3. "*Fractal Geometry and Number Theory: Complex dimensions of fractal strings and zeros of zeta functions*", Birkhäuser, Boston, 2000, 268+(xii) pp., (with M. van Frankenhuysen). [Refereed research monograph.]
4. "*Fractal Geometry, Complex Dimensions and Zeta Functions: Geometry and spectra of fractal strings*", Springer Monographs in Mathematics, Springer-Verlag, New York, 2006, approx. 500 pp. (precisely, 460+(xxiv) pp.), (with M. van Frankenhuysen). [Refereed research monograph.]
5. "*In Search of the Riemann Zeros: Strings, fractal membranes and noncommutative spacetimes*", *Amer. Math. Soc., Providence, RI*, 2008, in press, 592 pp. (precisely, 554+(xxix) pp.). (Refereed research monograph; expected to appear in the Winter of 2008.)

D. Four Examples of Synergistic Activities: (i) Associate Secretary, Amer. Math. Soc. (in charge of all the scientific meetings in the Western Section and of some of the national and international meetings of the AMS (including the forthcoming Joint National Meeting in San Diego, 1/08). (ii) Organizer of many research conferences in Mathematical Physics, Analysis, Dynamical Systems, Spectral Geometry or Fractal Geometry. (iii) Editor of several collective volumes at the interface of the above areas. (iv) Creation of a number of (Honors, undergraduate or graduate) courses and seminars in those areas as well as in Mathematical Biology.

E. Recent and Current Ph.D. Students and Postdocs: E. Atallah*, V. Alvarez, S. Childress, B. Daudert, C. Griffith, C. He, N. Lal*, H. Lu, M. Maroun*, R. Niemeyer*, J. Payne*, E. Pearce, J. Rock, J. Sarhad*, **NSF Postdocs:** A. Teplyaev (8/00-12/02). M. Anshelevich (9/02-8/04). Other Postdoc: S. Winter (07). **Recent VAPs:** M. Comerford (02-04), C. Ivan/Antonescu (04-05), D. Clahane (05-08), A. Censor (07-09).

* Unable to attend due to other duties.

[\[1\]](#) This is an excerpt from a publication list of 94 entries, of which 83 have appeared or are in press.