

Short Curriculum Vitae of Dr. Spyros Basilakos

(Director of Research)

1. Personal data:

Born in Athens 6/10/1972 (spoken languages: Greek, English and basic Spanish)

Member of the Hellenic Astronomical Soc. and the Greek association of Relativity and Cosmology.

Married to Nasia Darra and father of two children.

Work Address : **Centre for Astronomy & Applied Mathematics Academy of Athens**

Soranou Efessiou 4, 11527

Athens, Greece

Tel:+30-210-6597248

e-mail: svasil@academyofathens.gr

2. Introduction:

I am a cosmologist with a career spanning scientific research, academic teaching and science communication. I have held a number of academic positions at various universities around Europe. Currently, I am a Director of Research at the Academy of Athens (Research Center for Astronomy and Applied Mathematics - RCAAM). I am a member of the Hellenic Astronomical society, an elected Councillor of the Governing Board of the Hellenic Society for Relativity, Gravity and Cosmology and a member of the committee that proposed to the Greek Ministry of Education the National Council [for Research and Technology for the period 2017-2021.](#)

I completed my PhD studies in Cosmology at the University of Athens. During the period 1999-2002, I worked as a PPARC fellow at the Imperial College (UK). From 2002 to 2005, I worked within NOA's (National observatory of Athens) program searching for the clustering properties of the large scale structures. In 2005 I joined the astrophysics group at the University of Groningen (The Netherlands) as a NOVA fellow. For the period 2006-2014 I was a faculty member (Senior Researcher) at the Academy of Athens (RCAAM) and a Visiting Professor in Physical Cosmology at the University of Barcelona (2011-2012). Today I am Director of Research at RCAAM. In 2013 and 2014 I participated in the international Gravity competition organized by the Gravity Research Foundation (GRF -USA) and my scientific works received honorable mentions by GRF. I published 170 scientific articles out of which 120 in refereed journals and 50 in conference proceedings. Moreover, he supervised 1 Post-doc, 5 PhD, 5MSc and 5BSc theses and he participated in several international collaborations and scientific programs. Currently, I give lectures in Cosmology and General Relativity at the University of Athens and contributes to public engagement events in science.

3. Higher Education:

- Mathematics degree, University of Thessaloniki Greece (1991-1995)
- M.Sc. in Astronomy, University of Athens (1995-1997)
- Ph.D. in Physical Cosmology, University of Athens (1997-2000). As a part of my Ph.D program I went at the University of Cambridge (1998: Institute of Astronomy) in which I worked on the Topology of Universe. For the duration of my entire Ph.D. studies, the State Fellowship Institution has awarded me a fellowship after a national competition. I was awarded, by the Hellenic Astronomical Society, the best PhD thesis of the year 2000.

4. Academic Appointments:

14/11/1999 – 16/10/2001: Research associate (PPARC Post-doc): Imperial College, London. Working on Physical Cosmology.

02/12/2002 – 31/08/2005: Research associate (Post-doc): National Observatory of Athens. Working on Theoretical Astrophysics and Cosmology.

01/10/2005 – 28/09/2006: Research associate (Post-doc): Department of Mathematics & Physics University of Groningen, The Netherlands. Working on (a) Topology of the Universe, (b) nature of dark energy and (c) Mathematical & Physical Cosmology. This project funded by the Dutch State (NOVA fellowship).

28/09/2006 – 06/05/2010: Researcher (faculty) at the Academy of Athens (Centre of Astronomy & Applied Mathematics). Working on dark energy & Physical Cosmology.

06/05/2010 – 10/10/2014: Senior Researcher (faculty) at the Academy of Athens (Centre of Astronomy & Applied Mathematics). Working on Theoretical Physics, Physical Cosmology, Gravity and dark energy.

03/06/2011 – 31/12/2011: Visiting Professor (sabbatical) at the University of Barcelona department of Physics. Working on dark energy and alternative theories of gravity.

10/10/2014 – Present: Director of Research at the Academy of Athens (Centre of Astronomy and Applied Mathematics). Working on Theoretical Physics, Geometrodynamics and Gravitational Cosmology.

I have served as a vice President of the association of researchers at the Academy of Athens (2011-2014).

Councillor of the Governing Board of the Hellenic Society for Relativity, Gravity and Cosmology HSRGC (2016-2018).

Member of the committee that proposed to the Greek Ministry of Education the National council for Research and Technology for the period (2017-2021).

Compulsory Military service in the Greek Army (26/11/2001-26/11/2002) as a Military Police Officer (rank: sergeant major).

5. Fields of interest:

My main interests concentrate on nature of dark energy, unification between dark matter and dark energy, evolution of perturbations and structure formation in different cosmological models, early universe (including inflation), Gravitational Cosmology and Geometrodynamics.

In particular:

- Cosmological and statistical tests of General Relativity. Classical and quantum Cosmology of scalar fields
- Constraints on the cosmological parameters using observational data.
- Nature of dark energy [$\Lambda(t)$, scalar-vector fields, modified gravity etc] and the accelerating Universe.
- The physics of inflation and the evolution of matter perturbations.
- Statistical and geometrical measures for quantifying large-scale structure (galaxies, X-ray sources and clusters of galaxies).
- Use of numerical cosmological simulations for testing, describing and comparing scenarios of structure formation utilizing the Press-Schechter formalism.
- Use of alternative high- z tracers (HII-galaxies and X-ray selected AGN) to measure the expansion rate of the Universe.
- Models of the large-scale bias between mass-tracers and the underlying matter distribution.

6. Publications:

In the ~ 17 years of my academic career, my research work has led to ~ 120 publications in prestigious (impact factor >4) refereed journals (MNRAS, Phys. Rev. D., ApJ, A&A, JCAP, GRG, IJMPD, Astro-particle Physics). I have also **50** articles in conference proceedings. Out of the 120 refereed publications, I am the first author in $\sim 60\%$ of these, while I am a single author in 10 publications. Finally, my total number of citations is ~ 3000 (h-factor=33) according to the following database (http://adsabs.harvard.edu/abstract_service.html). *My publications list can be found in* (<http://astro.academyofathens.gr/people/sbasil/>).

7. Conference participation, organization & seminars:

I have given oral contributions in many international (37) and Hellenic (9) conferences and I was an invited speaker in some of these. I have participated in the LOC of 11 scientific international conferences. I have also been invited to present seminars in various departments and institutes (cf. Durham Univ., Cambridge Univ., Imperial College, Sussex Univ., Nottingham Univ., Universidad Autonoma de Madrid - Spain, Universidad de Barcelona – Spain, University of Leiden - The Netherlands and INAOE in Mexico).

8. Theorems and Lemmas:

In my publications among many propositions I have published **1 Lemma and 4 Theorems**. These can be found in

<https://arxiv.org/pdf/1311.2173v1.pdf>

<https://arxiv.org/pdf/1307.6694v1.pdf>

9. International Awards:

The following two scientific articles: "From inflation to dark energy through a dynamical Λ : an attempt at alleviating fundamental cosmic puzzles" and "A viable Starobinsky-like inflationary scenario in the light of Planck and BICEP2 results" by Basilakos, Lima & Sola, have received

honorable mentions in the 2013 and 2014 competition by the Gravity Research Foundation (USA). Both articles have been published by the Int. J. of Mod. Phys. D. (Special Issue). Recently my article "Measuring the effects of Loop Quantum Gravity" received an honorable mention in the 2017 Essay Competition of the Gravity Research Foundation. This article will be published in the special Issue (October 2017) of Int. J. of Mod. Phys. D.

10. Referee – Review Editor:

For the years 2007-2008 I have been an official referee of the European Science Foundation (ESF) in the field of "Dark Energy". For the years 2009-2010 I have been an official referee of the French National Research Agency (ANR) in the field of Cosmology. I am a regular referee of journals MNRAS, JCAP, ApJ, PRD, Astronomy & Astrophysics, IJMPD.

I was an editor (in collaboration with Prof. Manolis Plionis) of the Special Issue of IJMPD (published in 2015) on the topic "Testing Inflationary scenarios with the Planck and BICEP2 data". Also, I was invited to serve the Review Editorial Board of High-Energy and Astroparticle Physics journal.

11. Teaching & Student Supervision:

- I taught (tutorials) at the Imperial College for two academic years (1999-2001) the undergraduate first year course in Mathematics/Astrophysics. Mathematics
- Teaching the undergraduate third year course in Cosmology & General Relativity at the Department of Physics, University of Athens (started 2013)
- Teaching the postgraduate second year course in Cosmology at the Department of Physics, University of Athens (started 2013)
- Teaching the undergraduate third year course in Cosmology & General Relativity at the Department of Mathematics, University of Athens (started 2013)
- Member of the supervising committee of **5 PhD** theses: Andronikos Paliathanasis (Un. of Athens 2014), Constantinos-Parouris Orthodoxos (Un. of Pelloponese 2014), Athina Pouri (Un. of Athens), currently supervising these of Alexandros Papageorgiou (Un. of Thessaloniki) and I. Papagianopoulos (Un. of Athens). Member of the supervising committee of **5 MSc** theses and **4 BSc** theses.

12. Post-doc supervision:

I have supervised (in collaboration with Dr. I. Tereno) the post-doctoral fellowship of Dr. C. S. Carvalho in the field of Cosmology and dark energy (location Research Centre for Astronomy Academy of Athens, duration: 2010-2014).

13. Recent collaborations:

(a) "*Measuring the dark energy equation of state*": In this project using the basic properties of scalar fields, we attempt to measure the dark energy equation of state which is responsible for the accelerated expansion of the universe. This collaboration includes several Universities among which Un. of Thessaloniki, Cambridge UK, INAOE Mexico, IfA Hawaii USA) and ESO Chile.

(b) "*The Physics of dark energy*": I am collaborating with Prof. M. Plionis, Prof. J. Sola and his team (Un. of Barcelona), Prof. S. Capozziello (Un. of Naples), Prof. N. Mavromatos (Kings College), Prof. J. Barrow (Cambridge UK), Prof. P. Stavrinou (Un. of Athens) and Prof. J. A. S. Lima and his team to study the dynamical properties of the Friedmann Robertson Walker metric in various cosmological models included those of extended theories of gravity (Finsler, Gauss-Bonnet, Brans-Dicke, scalar tensor theories, $f(R)$, $f(T)$ etc).

(c) "*XMM/LSS collaboration*": I am participating in the analysis of XMM/LSS new survey in collaboration with several the Universities and Institutes. One of the aims of this program (in which I have the responsibility) is to study the Topology of the Universe.

12. Referees:

My curriculum vitae is supported by the following referees: a) **Prof. N. Mavromatos**, Kings College London (nikolaos.mavromatos@kcl.ac.uk), b) **Prof. S. Capozziello**, University of Naples (capozzie@na.infn.it), c) **Prof. J. Sola**, University of Barcelona (sola@ecm.ub.edu), d) **Prof. M. Dafermos**, University of Princeton and Cambridge (dafermos@math.princeton.edu) and e) **Prof. J. Barrow**, University of Cambridge UK (jdb34@hermes.cam.ac.uk).