

## 1 Personal

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## 2 Academic

### 2.1 Academic career

- **1987 Licenciatura in Mathematics branch of scientific specialization in Pure Mathematics, Faculty of Science, University of Porto** (four year degree in Mathematics/Theoretical Mathematics).
- **1986/91** 1985/87 - **Supervision of classes in the 'Theory of Manifolds'** final year option course for the Mathematics degree in the University of Porto. 1986/91 - Teacher of Mathematics in High School at Porto.
- **1990/91 Research in Optics and its applications** supervised by Prof. José R. Salcedo at Faculty of Science, University of Porto.
- **1991 Licenciatura in Physics and Applied Mathematics, majoring in Astronomy, Faculty of Science, University of Porto** (four year degree in Physics and Applied Mathematics).
- **1992 Master of Science in Astrophysics Degree, Department of Mathematics, Queen Mary and Westfield College, University of London.**  
MSc supervisor: Prof. Peter Coles.

- **1997 Doctor of Philosophy, PhD., in the University of Cambridge, Physics Department, MRAO, and Downing College, UK.**  
Research undertaken in the Radio Astronomy Group of the Cavendish Laboratory in the University of Cambridge in Cosmology.  
PhD supervisor: Prof. A.N. Lasenby.  
Thesis title: ‘Comparison of Microwave Background Predictions and Observations’.
- **1997 Postdoctoral Fellow in the Department of Physics, Kansas State University, USA.**
- **1998 Postdoctoral Fellow at the Center for Astrophysics of the University of Porto (CAUP), Portugal.**
- **1998 Invited Lecturer** for fourth-year course on ”Extragalactic Astronomy” (option in Astronomy) for the Physics and Applied Mathematics degree, University of Porto
- **1999 Lecturer** of post-graduate course on ‘Comparison of Microwave Background Predictions and Observations’, held at CAUP, June-July, 1999.
- **2000/01 Visitor at the University of Oxford**, research on ‘Testing Cosmological models with the Cosmic Microwave Background Radiation’, in collaboration with Prof. Joe Silk, Dr. Pedro Ferreira at Physics department of the University of Oxford; Dr. João Magueijo at Imperial College, University of London; Prof. A.N. Lasenby, Dr. Mike Hobson at Cavendish laboratory, University of Cambridge.
- **2000/2001 Co-supervisor with J. Silk** of PhD student, Rebecca Bowen, on studies of Compact Topologies.
- **2000/2002 Co-supervisor** of PhD student, Richard Savage on studies of Non-Gaussianity with a view to VSA experiment.
- **Since 2001 Research Associate** at the Center for Astrophysics of the University of Porto (CAUP), Portugal.
- **Since 2000 Academic Visitor at the University of Oxford**, Astrophysics group.
- **Since October 2001 Leverhulme Postdoctoral Fellow at the Cavendish Astrophysics Group, University of Cambridge, UK.** The Cambridge Leverhulme Quantitative Cosmology group is a collaboration between the Institute of Astronomy, the Cavendish Astrophysics and DAMTP Cosmology groups, all within the University of Cambridge.
- **2004/5 Lecturer of a graduate course on ‘Theoretical Cosmology: CMB and structure formation’**, at the Cavendish Astrophysics Group, University of Cambridge. (This course and other personal notes are under consideration for a future CUP publication as a book entitled ‘Cosmology: CMB and structure formation’)
- **2002/2003 Co-supervisor with A. Challinor** of PhD student, Gayoung Chon on ‘Theoretical Studies of the Cosmic Microwave Background’.
- **2002/5 PhD supervisor of**
  - Sarah Smith with thesis title: ‘Non-Gaussianity on the Cosmic Microwave Background’.
  - Nutan Rajguru with thesis title: ‘Observations of the Cosmic Microwave Background with the Very Small Array’.
- **2005 Postdoctoral Scholar in Physics at the Observational Cosmology Group**, in the California Institute of Technology, **Caltech**.
- **since 2006 Staff Scientist at the Infrared Processing and Analysis Center, IPAC**, in the California Institute of Technology, **Caltech**.
- **since 2009 Staff Research Scientist** at the Jet Propulsion Laboratory, **JPL**, and **Visitor at Caltech**, Physics Department, Observational Cosmology group.

## 2.2 Other Teaching experience

- **1994 College supervisor** for the course ‘**Part IA Elementary Mathematics for Biologists**’, New Hall, University of Cambridge.
- **2002 College supervisor** for the course ‘Mathematical Tripos Part IB, **Electromagnetism (O5)**’, Queens, Pembroke, Magdalene and Jesus College, University of Cambridge.
- **Since 2002 External Interviewer for Undergraduate Mathematics Admissions** for Magdalene College.
- **2003 College supervisor** for the course ‘Mathematical Tripos Part IB, **Introduction to Special Relativity (P6a)**’, Downing and Magdalene College, University of Cambridge.

## 2.3 Other Research experience

- **1999 Member of the Scientific Organizing Committee** of the ‘International Conference on Modern Theories of Structure Formation’, held in Porto, CAUP, September 13-18, 1999.
- **Since 1999 Element of the ‘CMBNET: Cosmic Microwave Background Network in Europe for Theory and Data Analysis’** within the European V-framework, as member of the ‘Cambridge Planck Analysis Center’, CPAC.
- **2000 Member** of the Local Organizing Committee of the **CMBNET** meeting, held at Oxford, first week of December 2000.
- **Since 2001 Member of the ‘Cambridge Planck Analysis Center’, CPAC**, as an Associate of the current working group. Planck satellite is a mission of ESA’s Horizon 2000 Scientific program designed to image the anisotropies of the Cosmic Microwave Background (CMB) radiation over the whole sky. I am also a member of several Planck Technical Working groups (WG1.7, WG4.1 and WG4.3, etc.).
- **Since 2002 Member** of the Planck project team in the HFI as **DPC** (data processing), **ScS** (Scientific support) and **Coll** (Collaborator).
- **2002 Co-organizer** of a **JENAM** (Joint European National Astronomical Meeting) 2002 workshop ‘The Cosmology of Extra Dimensions and Varying Fundamental Constants’, held at Porto on September 3-5.
- **since 2005 Member** of the Planck Algorithm Development Group, **ADG**, at Jet Propulsion Laboratory, JPL.
- **since 2005 Member of the Planck CTP Group, USPDC Group**, and more recently member of the Planck HFI Core team.
- **Referee** for the Monthly Notices of the Royal Astronomical Society Journal (MNRAS).
- **Referee** for the Modern Physics Letters A (MPLA).
- **Scientific consultant** for the Scientific and Technical Translation to Portuguese Prize Award. ( for instance on the book ‘The Elegant Universe’ by Brian R. Green translated from english to portuguese by João Pimentel and Ricardo Schiama.)
- **Organizer** of the Cosmo-lunch seminars held weekly at DAMTP, Cambridge.
- **Team member** of research projects funded by FCT, Portugal.
- **since 2005 LFI-liaison** between IPAC and the LFI Data Processing Center, DPC.
- **Since 2005/2006 Member of Planck LFI and HFI Core teams.**
- **Deputy** with Paolo Natoli as coordinator of the LFI CTA07 - core area of Power Spectrum.
- **Co-coordinator** with Eric Hivon of the HFI CTWG9 - core working group on Power Spectrum and Likelihoods.
- **Member** of several Core Areas and Core Working Groups in both the LFI and HFI Core teams:

1. Map-making core area in both LFI and HFI: HFI CTWG6 and LFI CTA04
  2. Parameter estimation in both HFI and LFI : HFI CTWG9 and LFI CTA08
  3. Non-CMB science : LFI CTA09
  4. Polarization: LFI CTA06
  5. Component Separation core area: LFI CTA05, HFI WG4
- **Member** of several Planck Working Groups:
    1. WG3 or CTP ( $C_l$  T and P) working group
    2. WG2 Component Separation working group
    3. Planck Sky Model, PSM team
    4. WG4 Non-Gaussianity working group
    5. WG5 SZ studies working group
  - **Organizer and coordinator** of the **Compact Source Investigation, CSI, collaboration** amongst IPAC, Santander, Cambridge, Paris, and Santander . This collaboration was set up to help build up the compact source detection pipeline for production of the Early Release Compact Source Catalog at IPAC, an US official Planck deliverable.
  - **Co-organizer** with Bill Reach of the **Planck Point Source workshop** hosted at IPAC in February 2008, with broad attendance (37 registered) across project including Planck Principal Investigators, PI's . Contact point for several of the participants.
  - since 2005 work actively with students and postdocs from both **Caltech, campus and JPL** on **Planck** as well as on other experiments such as **bicep, CBASS, QUIET** (a large percentage of my time has been dedicated to Planck), such as Kevin Huffenberger, Loris Colombo, Sanjit Mitra, Rajib Saha, etc.
  - **Future potential visitors:** David Sutton, Pedro Ferreira's student from Oxford; Anthony Challinor's PhD students from Cambridge; Pedro Carvalho, Mike Hobson's PhD student from Cambridge, etc
  - **Recent visitors:** Carlo Contaldi from Imperial College, London; Roberto Trotta from University of Oxford, UK, Luca Pagano, Alessandro Melchiorri's PhD student from Rome; Duncan Hanson, Anthony Challinor's PhD students from Cambridge; Marcos Caniego, a research visitor of Mike Hobson from Cambridge.

### 3 Scholarships

- **Leverhulme Fellowship** for research in the University of Cambridge.
- **Postdoctoral Fellowship** by the Foundation for Science and Technology (FCT) for research at the Center for Astrophysics of the University of Porto (CAUP).
- **Postdoctoral Fellowship** (NSF grant with matching support from the State of Kansas and from a K\*STAR First award) for research in the Kansas State University.
- **JNICT PhD scholarship** for research in the University of Cambridge.
- **JNICT MSc scholarship** for research in the University of London.
- **JNICT scholarship for research in Optics and its applications**, 1990-91, in the University of Porto.

## 4 Other technical details

Familiar with various CMB codes and with several stages of the Planck data analysis, such as:

- Planck **LevelS** pipeline for generation of timelines, TOD
- **Springtide** code, a destripper Mapmaking algorithm
- familiar and involved in development of **Xfaster**, a Power Spectrum estimation algorithm, and **Xfaster Like**, a algorithm to compute the Likelihood at high- $l$
- co-developed **PowellSnakes**, a algorithm for discrete object detection
- familiar with **PSM** code, a Planck Sky model pipeline
- in the process of training with **Commander**, a Power Spectrum estimator and Component Separation algorithm based on the **Gibbs** methodology
- involved in development by changing the standard code **CAMB** and **CMBFAST**, algorithms to compute the CMB Power Spectrum,  $C_l$
- involved in development (by inclusion of Xfaster likelihood module in the runs) of **Cosmomc**, a MCMC Parameter estimation algorithm
- **PICO**, a fast estimator of the CMB Power Spectrum,  $C_l$
- co-developed **NGsims**, a algorithm to generate CMB Non-Gaussian simulations
- co-developed **TOPOLsims**, a algorithm to generate Compact Topologies
- co-developed a **Bispectrum estimator for interferometers**, code to estimate the bispectrum on interferometric data
- co-developed **SCR Likelihood**, a algorithm to estimate the new ‘SCR’ Likelihood that corrects for the bias of WMAP like when the signal is Non-Gaussian
- familiar with **WMAP Like**, the WMAP likelihood code for parameter estimation
- involved in development of **Healpix**, NGsims has been recently incorporated in the Healpix ‘beta’ version
- Languages: very familiar with Fortran, IDL, Healpix, while in training phase regarding C and C++.