

Physique Théorique et Mathématique
Université Libre de Bruxelles
and International Solvay Institutes
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// **Jácome Armas**

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ACADEMIA

Post-Doctoral Fellowships

>> Post-Doc at Université Libre de Bruxelles (Jan 2015-Dec 2017)

Description: my research focuses on holographic dualities between gravitational black hole solutions and effective descriptions of viscous fluids and elastic solids. The main objective is to continue pursuing the connection between deformations of black hole geometries and the physics of elastic materials via the blackfold approach and apply it to non-trivial spaces like Schroedinger space-times.

>> Post-Doc at The Albert Einstein Center for Fundamental Physics, University of Bern under Prof. Matthias Blau (Jan 2013-Dec 2014)

Education

>> PhD in Theoretical Physics, 2009-2012

University of Copenhagen (Denmark) | The Niels Bohr Institute

Thesis: '**(Electro)Elasticity from Gravity**'

Supervisors: Prof. Niels Obers & Prof. Troels Harmark

>> Masters, Part III, Certificate of Advanced Study in Mathematics, 2007-2008

University of Cambridge (England) | DAMTP

Essay: '**Numerical Analysis of the Cyclic Model**'

Supervisors: Prof. Neil Turok & Dr. Daniel Wesley

>> Erasmus exchange program, 2005-2006

Trinity College Dublin (Ireland) | Department of Physics

Thesis: '**Finite Element Analysis of Foam Drainage**'

Supervisors: Prof. Denis Weire & Dr. Eric Janiaud

>> Degree in Engineering Physics, 2002-2007

University of Aveiro (Portugal) | Department of Physics

Thesis: '**Enhancement of Electromagnetic fields at rough Dielectric-Metal Interfaces**'

Supervisor: Prof. Sushil Mendiratta

Scientific Residences

>> Kyoto University, Department of Physics (Japan), Feb 2013

Host: Masafumi Fukuma

>> Tata Institute for Fundamental Research (India), Nov 2010-Mar 2011

Host: Shiraz Minwalla

Awards/Grants

- >> Prize for best contribution to the conference **Recent Developments in String Theory** in Ascona with the talk Black Holes and Biophysical (Mem)-branes, 2014
- >> **Genius Prize** for Science Communication attributed by the Danish Association of Science Journalists at the **1st European meeting of science journalists**, 2014
- >> Short Visit Travel Grant attributed by the Holograv Network, Niels Bohr Institute, 2014
- >> Deemed **Notable of the Azores Islands** by the Azorean Government, 2014
- >> Horta City Gold Medal for Citizen Merit, Azores, 2013
- >> Grant from NBI for compiling the book **'Conversations on Quantum Gravity'**, 2011
- >> Financial support from NBI for organizing **'Science & Cocktails'**, 2010-2012
- >> FCT PhD Scholarship, Portuguese Ministry of Science, 2009-2012
- >> Awarded the 2nd prize in the Art Contest Lab Jovem, Azores, for writing the book **Conjunto Homem**, 2009
- >> Cambridge Trust Bursary, University of Cambridge, 2007
- >> Best Engineering Physics student award, University of Aveiro, 2007
- >> Erasmus Grant, University of Aveiro, 2005

Publications

- >> J.Armas & M. Blau, **'New Geometries for Black Hole Horizons'**, JHEP 1507 (2015) 048
- >> J.Armas & M. Blau, **'Blackfolds, Plane Waves and Minimal Surfaces'**, JHEP 1507 (2015) 157
- >> J.Armas, **'Uniqueness of Black Holes with Bubbles in Minimal Supergravity'**, Class.Quant.Grav. 32 (2015) 4, 045001
- >> J.Armas & T. Harmark, **'Constraints on the effective fluid theory of stationary branes'**, JHEP 1410 (2014) 63
- >> J.Armas & M. Blau, **'Black Probes of Schrödinger Spacetimes'**, JHEP 1408 (2014) 140
- >> J.Armas & T. Harmark, **'Black Holes and Biophysical (Mem)-branes'**, Phys. Rev. D 90, 124022 (2014)
- >> J.Armas, **'(Non)-Dissipative Hydrodynamics on Embedded Surfaces'**, JHEP 1409 (2014) 047
- >> J.Armas, J. Gath & N.A. Obers **'Electroelasticity of Charged Black Branes'**, JHEP 1310 (2013) 035
- >> J.Armas, N. A. Obers & A.V. Pedersen **'Null-Wave Giant Gravitons from Thermal Spinning Brane Probes'**, JHEP 1310 (2013) 109
- >> J.Armas, **'How Fluids Bend: the Elastic Expansion for Higher-Dimensional Black Holes'**, JHEP 1309 (2013) 073
- >> J.Armas & N.A.Obers, **'Relativistic Elasticity of Stationary Fluid Branes'**, Phys. Rev. D 87, 044058 (2013)
- >> J.Armas, J.Gath & N.A.Obers, **'Black Branes as Piezoelectrics'**, Phys. Rev. Lett. 109, 241101 (2012)
- >> J.Armas, T.Harmark, N.A.Obers, M.Orselli & A.V.Pedersen, **'Thermal Giant Gravitons'**, arXiv:1207.2789, JHEP 1211 (2012) 123
- >> J.Armas, P.Caputa & T.Harmark, **'Domain Structure of Space-Times with a Cosmological Constant'**, Phys.Rev. D85 (2012) 084019
- >> J.Armas, J.Camps, T.Harmark & N.A.Obers, **'The Young Modulus of Black Strings and the Fine Structure of Blackfolds'**, JHEP 1202 (2012) 110
- >> J.Armas & N.A.Obers, **'Blackfolds in (Anti)-de Sitter backgrounds'**, Phys. Rev. D83, 2011
- >> J.Armas, **'Maximal Analytic Extension and Hidden Symmetries of Dipole Black Rings'**, Class. Quantum Grav. 28 (2011) 235014.
- >> J.Armas & T.Harmark, **'Uniqueness Theorem for Black Hole Space-times with Multiple Disconnected Horizons'**, JHEP, Vol. 1005, 2010

Public Outreach | Science Communication

- >> Founder and main Organizer of **Science & Cocktails**, Mar 2010-present

Description: Science & Cocktails is a series of public lectures intertwined with media art and dry ice cocktails. It is held at Byens Lys in Copenhagen and at The Orbit Jazz Club in Johannesburg. Its aim is to reach a large audience with different backgrounds and spread scientific knowledge in an entertaining way. In Copenhagen it counts now with an average of 650 participants, while in Johannesburg with an average of 150 people. All lectures are recorded and uploaded onto the internet. Names such as David Gross, Michael Shermer, Susan Blackmore, Bruce Hood, David Nutt and Cedric Villani have been part of its programme.

- >> Compilation of book *Conversations on Quantum Gravity*

Description: this project started out with the idea of compiling a series of interviews to different theoretical physicists, about their views on the current state of the field and with particular focus on the quest for quantum gravity, and publish it in book form. However due to the amount of research needed and of a quite different nature I will propose a long review article on the history of quantum gravity together with the book. I have so far interviewed 27 scientists around the world, such as David Gross, Franck Wilczek, Gerard 't Hooft, Roger Penrose, Steven Weinberg, Juan Maldacena, Cumrun Vafa, among others. The book is meant for both a general and academic audience and has the secondary intention of showing that there are alternative ways of financing fundamental research that can give something back to society, as all the turnover from the book sales will be allocated for attributing a PhD scholarship.

- >> **Co-founder and Co-director of the cultural and scientific newspaper Fazenda**, Azores, Aug 2008 - Apr2012
- >> **Danskere kaster lys over sorte huller**, article in Jyllands-Posten, due to PRL work with N. A. Obers and J. Gath, Dec 2012.
- >> **Multidimensional black holes get electric when flexed**, interview for the New Scientist, Dec 2012
- >> **New knowledge about the remarkable properties of black holes**, interview Phys.org, Dec 2012
- >> **Member of the Art Collective Live Art Installations**, creating art installations inspired in scientific endeavours, May 2012 - present
- >> **A night culture evolving around knowledge**, invited talk at the 1st European Conference of science journalists, ESOF 2014, Copenhagen.
- >> **How to go beyond the cafe scientifique?**, invited talk at science communication meet up in Copenhagen, Mar 2014.
- >> Consultant for the **Danish Ministry of Science** regarding their outreach activities, Jun 2015.
- >> **Building a night culture around scientific knowledge**, invited article for The Conversation (Africa), with K.Zoubos and K.Goldstein, Sep 2015.
- >> **Part of the Azorean Government campaign ProSucesso**, with the purpose of decreasing the high school drop out rate, Azores, September 2015-present

Supervision of graduate students

- >> Unofficial co-supervisor of PhD student Marco Sanchioni (Supervisor: Niels Obers) Niels Bohr Institute, University of Copenhagen, 2013-present.

Teaching Assistant

- >> String Theory, Niels Bohr Institute, 2009
- >> General Relativity, Niels Bohr Institute, 2010 & 2011

Research Assistant

- >> Trinity College Dublin, Jun-Aug 2006
Project: **'Finite Element Analysis of 2D Foam Drainage'**
Supervisors: Dr. Stefan Hutzler & Dr. Eric Janiaud

Institutional Responsibilities

- >> Scientific Advisor for the Azorean Government, part of **Rede Prestige**, Azores, Jan 2013- present
- >> Member of the Junior Faculty committee, NBI, 2010-2012
- >> Co-designer of the HET group website, NBI, 2009
- >> Member of Darwin's College music committee, Cambridge, 2007-2008

Referee in International Scientific Journals

- >> Physical Review D
- >> Journal of High Energy Physics
- >> Nuclear Physics B

Invited Talks/Seminars

- >> Seminar, University of Witwatersrand, South Africa, '**Effective theories for bubbles, branes and black holes**', Sep 2015
- >> Seminar, University of Amsterdam, Amsterdam, '**Effective theories for bubbles, branes and black holes**', Sep 2015
- >> Talk, The String Theory Universe, Leuven, '**Membrane Hydrodynamics and Black Soap Bubbles**', Sep 2015.
- >> Talk, MG14, Rome, '**New Geometries for Black Hole Horizons**', Jul 2015.
- >> Seminar, NIKHEF, Amsterdam, '**Equilibrium partition functions and black probes in supergravity**', Apr 2014.
- >> Seminar, University of Groningen, '**Equilibrium partition functions and black probes in supergravity**', Apr 2014.
- >> Talk, Recent Developments in String Theory, Ascona, '**Black holes and Biophysical membranes**', Jul 2014
- >> Talk, New Frontiers in Dynamics Gravity, Cambridge, '**The Elastic expansion for Higher-Dimensional black holes**', Mar 2014
- >> Seminar, Barcelona University, '**Hydrodynamics on Embedded Surfaces**', Oct 2013
- >> Seminar, String Theory Universe, '**Brane effective actions and BH Elasticity**', Sep 2013
- >> Seminar, Kyoto University, '**(Electro)elasticity from Gravity**', Feb 2013
- >> Seminar, IPMU, '**(Electro)elasticity from Gravity**', Feb 2013
- >> Seminar, Nagoya University, '**Hot and Spinning Giant Gravitons**', Feb 2013
- >> The Holographic Way, Nordita, '**(Electro)elasticity from Gravity**', Nov 2012
- >> Bits, Branes and Black Holes, KITP, '**Black Branes as Elastic materials**', Apr 2012
- >> Models of Gravity, Bremen University, '**Elasticity of Black Strings**', Mar 2012
- >> Nordic Meeting, NBI, '**The Young Modulus of Black Strings**', Nov 2011
- >> Seminar, HRI, '**Blackfolds**', Feb 2011
- >> Seminar, TIFR, '**Blackfolds**', Feb 2011
- >> Talk, Conference on black holes in higher-dimensional gravity, Imperial College, '**Rod Structure of Asymptotically (A)dS Space-Times**', Oct 2010
- >> Talk, Nordic String Meeting, Stockholm University, '**Uniqueness Theorem for Black Hole Space-times with Multiple Disconnected Horizons**', Nov 2009

Informal Talks

- >> Journal Club , '**Black Biology: Black Holes as Cellular Membranes**', Bern, May 2014
- >> Journal Club , '**Black Biology: Black Holes as Cellular Membranes**', NBI, May 2013
- >> Journal Club , '**Superfluids from Gravity**', NBI, Jun 2012
- >> Journal Club , '**Dipole Corrections to the Blackfold Approach**', NBI, May 2011
- >> Journal Club , '**Maximal Analytic Extension of the Black Ring**', NBI, May 2009

Conferences/Workshops

- >> The String Theory Universe, Leuven, September 2015
- >> Gravity: New perspectives from Gravity and Higher Dimensions, Benasque, July 2015
- >> MG14, Rome, July 2015
- >> Recent Developments in String Theory, Ascona, July 2014
- >> Strings 2014, Princeton, July 2014
- >> Holography for Black Holes and Cosmology, ULB, Apr 2014
- >> New Frontiers in Dynamical Gravity, Cambridge, Mar 2014
- >> Black Holes and Quantum Information, Weizman Institute of Science, Jan 2014
- >> String Theory Universe, University of Bern, Sep 2013
- >> Current Themes in High Energy Physics and Cosmology, NBI, Aug 2013
- >> New Perspectives from Gravity in Higher-Dimensions, Benasque, July 2013
- >> Black Hole Horizons and Quantum Information, CERN, Mar 2013
- >> Gravity and Lorentz Violations, IPMU, Feb 2013
- >> The Holographic Way, Nordita, Nov 2012
- >> Models of Gravity, Bremen University, April 2012
- >> String Theory workshop, Benasque, Jul 2011
- >> Strings 2011, Uppsala, June 2011
- >> Black Holes in higher-dimensional gravity, Imperial College, 2010
- >> The 25th Nordic String Meeting on Strings, Fields and Branes, Stockholm, 2010
- >> The 23rd Nordic String Meeting on Strings, Fields and Branes, NBI, 2009
- >> The 22nd Nordic String Meeting on Strings, Fields and Branes, Stockholm, 2008

PhD Schools

- >> NBI Elite PhD School on Integrability, NBI, Oct 2010
- >> NBI Elite PhD School on higher-dimensional Black Holes, NBI, Oct 2009
- >> Spring School on Superstring theory and related topics, ICTP, Mar 2009
- >> String Theory & Supergravity PhD School, CERN, Feb 2009
- >> Amsterdam String Theory PhD School, University of Amsterdam, Nov 2008

Conference organizing

- >> Sound and light technical assistance for The String Theory Universe, Bern 2013

CULTURAL/BUSINESS MANAGEMENT

Cultural Initiatives

- >> Vice-President of the Cultural Association **Fazendo**, Azores, Oct 2008 - May 2012
- >> Director of the Cultural & Scientific Newspaper **Fazendo**, Azores, Oct 2008-May 2012
- >> Co-founder of **Think Tank Fazendo**, Azores, 2010
- >> Member of the collective '**Fabrikken**' running **Byens Lys**, CPH, Mar 2011-present

Description: Underground venue in the heart of Christiania in Copenhagen. Some of the events consist on regular movie screenings, art festivals, film festivals, concerts, cabarets and lectures.

Business Initiatives

>> Co-manager & Co-owner of **Huset Ved Kongens Have**, Copenhagen, Aug 2009-Jul 2010

Description: **Huset Ved Kongens Have** (HVKH) was a cocktail bar and art gallery located at the center of Copenhagen. It served old school cocktails and hosted dinner and release parties.

ART/MUSIC PROJECTS

Installation Art

>> Member of the Artist Collective '**Live Art Installations**', CPH, May 2012 - present

>> **Orb Habitat**, Copenhagen, Feb 2015, permanent installation

>> **Deconstructing Azorean Traditional Music**, Lisbon Baixa Metro Station, Jul 2013

>> **Ocean Solstice**, Copenhagen, Dec 2012

>> **Urbanbotics**, Copenhagen, Jun 2012

Description: the aim of this project was to create a set of DMX controlled underwater lamps that could float on the water surface or submerge into the bottom of the harbor (5 meters). The 7 lamps were attached to a plastic glowing screen and an air compressor could pump air into the screen, expelling the water and make them raise to the surface. The installation ran for three consecutive days and was controlled by an arduino and relay switches controlling the pumps. The lamps reacted to the sound of the city and audience via a hidden microphone and mimick the language of sea creatures through their developing light patterns.

>> **The Battle of Copenhagen**, Copenhagen, Aug 2012

Description: this project consisted on a large scale event with 60 dancers, 100 double bass players and sailing ships lasting for 1.30h at Copenhagen's harbor. My role was to develop a system capable of transmitting wireless signals to the lamps on platforms floating on the water where the dancers were performing. The lamps were running on battery power. This required using an easy-going Max/MSP library created by Hjalte Basted Møller that could deal with sending signals to multiple XBee's and arduinos on each platform. The light design and light patterns were adapted to each platform with its individual theme.

Music

>> Sound design for **Medeiros/Lucas**, Jul 2014-present

>> **O Experimentar Na M'Incomoda**, Aug 2010-present

Description: traditional azorean music...more or less. Two records released. My role here is to synthesize new sounds and patterns using languages such as Max/MSP, Matlab and also Arduinos.

>> **Babudjah**, Oct 2009-present

Description: this is a music project created in collaboration with the artist/musician Pedro Lucas. We have created the soundtrack for a documentary on marine life edited by the department of biology of Azores' university which will be broadcasted on Azoren TV.

Literature

>> The Set of All Men, Apr-Oct 2009

Description: this is a literature book written in portuguese in a style inspired by the portuguese writer Gonçalo M. Tavares. It is a critic to logic and new age and it is mainly based on my study on the philosophy of Wittgenstein and on the neuroscience research of António Damásio. It is part of a trilogy which is now in preparation. It was awarded the second prize in the Azorean contest **LabJovem**, 2009. It was part of the catalog of the international agent **Ella Sher** and has been represented at Frankfurt's International Book Fair (2011). It was published in August 2014 in the label **Companhia das Ilhas** and it is available at **FNAC STORES**.

>> Publications (selected)

- > J.Armas, '**Through the eyes of Oliver Sacks**', Fazendo nº9, 2009
- > J.Armas, '**On Brief Notes on Science**', Fazendo nº15, 2009
- > J.Armas, '**Impressionism and Biology**', Fazendo nº28-29, 2009
- > J.Armas, '**Cultural and Creative Industries**', Fazendo nº42, 2010
- > J.Armas, '**Think Tanks**', Fazendo nº44, 2010
- > J.Armas, '**Fazendo's Megalomania**', Fazendo nº65, 2011

>> Interviews (selected)

- > Interview for Kudos Magazine, Apr 2012, Copenhagen, Denmark
- > Interview for the newspaper Açoriano Oriental, Dec 2011, Açores, Portugal
- > Interview for the magazine The New Scientist due to PRL work, Dec 2012
- > Interview for the magazine Phys.org due to PRL work, Dec 2012
- > TV appearance in the program Portugueses pelo Mundo, Aug 2012
- > Interview for the newspaper Diário Insular, Azores, Feb 2013
- > Interview for the newspaper Tribuna das Ilhas, Azores, Sep 2014
- > Interview for the radio Rádio Clube Angra, Azores, Sep 2014
- > Sinais com Fernando Alves, 2014