

# Yashar Akrami

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## EDUCATION

- PhD in Theoretical Physics (Cosmology and Astroparticle Physics)** **June 23, 2011**  
 The Oskar Klein Centre for Cosmoparticle Physics, Department of Physics, Stockholm University, Sweden.  
 Thesis title: *Supersymmetry vis-à-vis observation: dark matter constraints, global fits and statistical issues.*
- PhL (Fil. Lic.) in Theoretical Physics (Cosmology and Astroparticle Physics)** **February 26, 2010**  
 The Oskar Klein Centre for Cosmoparticle Physics, Department of Physics, Stockholm University, Sweden.  
 Thesis title: *Weak-scale supersymmetry: parameter space, complexity and global fits.*
- Masters in Physics (Cosmology)** **January 18, 2006**  
 Department of Physics, Sharif University of Technology, Tehran, Iran.  
 Thesis title: *Primordial perturbations as an observational probe of inflation*; completed at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India.
- Bachelors in Electrical Engineering (Control and Telecommunication)** **September 21, 2003**  
 Department of Electrical Engineering, Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran.
- High school** **September 21, 1998**  
 National Organization for Development of Exceptional Talents (NODET), Iran.

## PROFESSIONAL EXPERIENCE

- Junior Research Chair in Theoretical Cosmology** **October 1, 2018 - present**  
 International Center for Fundamental Physics (ICFP), École Normale Supérieure (ENS), Paris, France.  
 Awarded as the *2018 laureate* of the prestigious ENS-ICFP Junior Research Chair program - including funding for hiring PhD students.
- Senior Postdoctoral Research Fellow in Cosmology** **August 1, 2016 - July 31, 2018**  
 Lorentz Institute for Theoretical Physics, Leiden University, The Netherlands.
- Postdoctoral Research Fellow in Cosmology** **November 5, 2014 - July 31, 2016**  
 Institute for Theoretical Physics (ITP), Heidelberg University, Germany.  
 DFG-funded project TRR33 “The Dark Universe”.
- Postdoctoral Research Fellow in Cosmology** **August 1, 2011 - November 4, 2014**  
 Institute of Theoretical Astrophysics, University of Oslo, Norway.  
 ERC-funded project “The Anisotropic Universe: A Reality or Fluke?”.

## SCIENTIFIC AND PROFESSIONAL DUTIES

- *Large-scale collaborations:*
- Member of the **LiteBIRD** Collaboration; 07.2019 - present
  - Member of the ESA **Euclid** Consortium (active mainly in Theory Working Group); 01.2012 - present
  - **Leader** of **Euclid** Work Package on *initial conditions (early Universe)*; 11.2018 - present
  - **Coordinator** of **Euclid** Theory Working Group’s Key Project “Forecasts for beyond-standard models in cosmology and fundamental physics”; 03.2021 - present
  - Member of the **Square Kilometer Array (SKA)** Collaboration (Cosmology SWG); 01.2015 - present
  - LFI Core Team Member of the ESA **Planck** Collaboration; 06.2013 - present
  - Member of the proposing team for **CMB-HD**; 01.2019 - present
  - Member of the **Euclid** Consortium Diversity Committee (ECDC); 06.2018 - present
  - Member of the **Aquila** Consortium for Bayesian Large-Scale Structure Inference; 10.2018 - present
  - Member of the **European COST Action** “Cosmology and Astrophysics Network for Theoretical Advances and Training Actions (**CANTATA**)”; 08.2016 - present
  - Affiliated member of the NASA **Fermi Large Area Telescope (LAT)**; 2008 - 2011
- *Member of organizing committees for:*
- Cosmology at the Crossroads; online conference, February 2021
  - SKA Cosmology SWG Meeting; École Normale Supérieure, Paris, France, January 2020
  - GOLD: The Golden Cosmological Surveys Decade; Paris-Saclay, France, April-June 2020
  - Paris Primordial Cosmology Meetings (3 per year); Paris, France, started in 2019
  - 9th and 10th TRR33 Winter School on Cosmology; Passo del Tonale, Italy, December 2015 and 2016

- Tehran Conference on Modified Gravity; Tehran, Iran, January 2016
- Heidelberg-Geneva Workshop on Cosmology: Gravity at the Largest Scales; Heidelberg, Germany, October 2015
- ITP Local Interactions 2015: Gravity Beyond Einstein; Heidelberg, Germany, May 2015
- International Conference on Beyond  $\Lambda$ CDM; Oslo, Norway, January 2015
- Dark Matter Meeting; Oslo, Norway, October 2011
- OKC Workshop on Supersymmetry (PROSPECTS); Stockholm, Sweden, September 2010
- Associate member of the Committee on Space Research (COSPAR); 2014 - present
- Organizer of Leiden Cosmology Seminars, 2016 - 2018, Leiden, The Netherlands
- Organizer of ITP Cosmology Seminars, 2015 - 2016, Heidelberg, Germany
- Editorial Board of “Universe” Cosmology Section and guest editor for special issue “Late Time Universe: Cosmic Acceleration”
- Referee for international journals:
  - Physical Review D
  - Physical Review Letters
  - Physics Letters B
  - Journal of Cosmology and Astroparticle Physics (JCAP)
  - Journal of High Energy Physics (JHEP)
  - Monthly Notices of the Royal Astronomical Society
  - Classical and Quantum Gravity (CQG)
  - Physics of the Dark Universe
  - Universe
  - General Relativity and Gravitation (GERG)
  - European Physical Journal C
  - Reports on Progress in Physics
  - European Journal of Physics
  - Journal of Physics G
  - Astrophysics and Space Science
- Other duties and memberships:
  - Management Committee Member (representative of the Netherlands) for the European COST Action CANTATA; 2016 - 2018
  - PhD dissertation committees and PhD/postdoc selection panels (Leiden & Paris)
  - Evaluation of grant applications for COST (European Cooperation in Science and Technology), Academy of Finland, and Estonian Research Council
  - European Physical Society; 2010 - present
  - Swedish Physical Society (2010 - 2014) and Swedish Association of University Teachers (2010-2012)

## ACADEMIC AND RESEARCH INTERESTS

- New physics beyond the standard model of cosmology
- Early-Universe cosmology: cosmic microwave background, initial conditions, inflation and alternatives, primordial perturbations, large-scale structure, primordial gravitational waves, primordial black holes, string cosmology
- Cosmic acceleration: dark energy, cosmological constant problem, infrared theories of gravity, large-scale structure, fundamental physics (supergravity, string theory, quantum gravity) based models of dark energy
- Cosmological tests of gravity: large-scale structure (ultra-large scales, nonlinear regime), gravitational waves
- Laboratory tests of gravity and dark energy
- Implications of cosmology for fundamental theories (supergravity, string theory, quantum gravity)
- Large-scale cosmic anomalies and observational tensions: model building and data analysis
- Searching for the topology of the Universe
- Multi-messenger cosmology: cosmological surveys (*Planck*, *Euclid*, *SKA*, *LiteBIRD*, *CMB-HD*)
- Big data, statistical inference and high-performance computing in cosmology and fundamental physics
- Artificial intelligence in cosmology and fundamental physics
- Theory and phenomenology of dark matter

## SELECTED RESEARCH VISITS

- Jodrell Bank Centre for Astrophysics, Department of Physics and Astronomy, University of Manchester, UK [February 2020]
- Lorentz Institute for Theoretical Physics, Leiden University, Netherlands [September 2019]
- Imperial College London, UK [May 2019]
- Queen Mary University of London, UK [May 2019]
- Institute of Cosmology and Gravitation - University of Portsmouth, UK [May 2019]
- King’s College London, UK [May 2019]
- University of Nottingham, UK [April 2018]
- Institut de Physique Théorique, CEA Saclay, Paris, France [September 2017]
- Institute for Research in Fundamental Sciences (IPM), Iran [November-December 2016 and August 2017]
- The Oskar Klein Centre for Cosmoparticle Physics, Stockholm University, Sweden [September 2016]
- University of Geneva, Switzerland [November 2015]

- Bielefeld University, **Germany** [July 2015]
- Nordic Institute for Theoretical Physics (NORDITA), **Sweden** [March and August 2015]
- Lund University, **Sweden** [June 2015]
- DAMTP, University of Cambridge, **UK** [June 2014]
- ITP, Heidelberg University, **Germany** [May 2014]
- DAMTP, University of Cambridge, **UK** [April 2014]
- California Institute of Technology (Caltech) and NASA Jet Propulsion Laboratory (JPL), **USA** [November and December 2013]
- Asia Pacific Center for Theoretical Physics (APCTP), **South Korea** [June 2013]
- California Institute of Technology (Caltech) and NASA Jet Propulsion Laboratory (JPL), **USA** [November and December 2012]
- University of Oxford, **UK** [April - June 2012]
- Inter-University Centre for Astronomy and Astrophysics (IUCAA), **India** [summer and autumn 2005]
- Inter-University Centre for Astronomy and Astrophysics (IUCAA), **India** [summer and autumn 2004]

#### SELECTED SCHOOLS/CONFERENCES/MEETINGS (mainly as speaker/organizer except for early schools)

- **2021:**

- From Quarks to Cosmos with AI, **Online**
- Roman Information Sessions, **Online**
- Cosmology from Home 2021, **Online**
- PASCOS 2021, **Online**
- Growth of Structure Summer Seminar Series, **Online**
- Euclid Consortium Meeting 2021, **Online**
- Cosmology at the Crossroads, **Online**

- **2020:**

- BeyondPlanck Release Conference, **Online**
- ESO Conference: “Assessing Uncertainties in Hubble’s Constant Across the Universe”, **Online**
- LiteBIRD France, **Online**
- Euclid Theory Working Group Meeting 2020, **Online**
- Euclid Consortium Meeting 2020, **Online**

- **2019:**

- B-mode from Space, Max-Planck-Institut für Astrophysik, Garching, **Germany**
- CoSyne: Cosmological synergies in the upcoming decade, Institut d’Astrophysique de Paris (IAP), Paris, **France**
- French Dark Energy Theory Meeting, Institut Henri Poincaré, Paris, **France**
- Aquila Consortium meeting, Imperial College London, **UK**
- ENS team-building meeting, Roscoff, **France**
- The Paris-Saclay AstroParticle Symposium 2019, Institut Pascal, **France**
- Paris-Amsterdam-London-Stockholm 9th meeting (PALS) 2019, Sorbonne University, Paris, **France**
- Understanding cosmological observations, Benasque, **Spain**
- Particle physics, String theory and Cosmology (PASCOS) 2019, University of Manchester, **UK**
- Gordon Research Conference (GRC) on String Theory and Cosmology: New Physics in the Era of Precision Cosmology, Barcelona, **Spain**
- Gordon Research Seminar (GRS) on String Theory and Cosmology: Accelerating Expansion and Cosmological Evolution in String Theory, Barcelona, **Spain**
- Inflation and Geometry, Institut d’Astrophysique de Paris (IAP), Paris, **France**
- Euclid Consortium Meeting 2019, Helsinki, **Finland**
- Planck NPIPE meeting, Institut d’Astrophysique de Paris (IAP), Paris, **France**
- Euclid Theory Working Group Meeting 2019, University of Oxford, **UK**
- Cosmology@Malta, Fort St Elmo, Valletta, **Malta**

- **2018:**

- SKA-France meeting, École Normale Supérieure (ENS), Paris, **France**
- Aquila Consortium meeting, Institut d’Astrophysique de Paris (IAP), Paris, **France**
- Machine Learning @IHP, Institut Henri Poincaré, Paris, **France**
- Analytics, Inference, and Computation in Cosmology, Institut Henri Poincaré, Paris, **France**
- The vacuum of the Universe 2018: from cosmology to particle physics – CMB Anomalies and Tensions, Institute of Cosmos Sciences (ICCUB), Barcelona, **Spain**
- Euclid Theory Working Group Meeting, Institut Henri Poincaré, Paris, **France**
- Euclid Theory Work Package I (Cosmic Acceleration and Tests of Gravity) Meeting, University of Lisbon, **Portugal**
- Physics@Veldhoven, Veldhoven, **Netherlands**

- **2017:**

- Square Kilometre Array (SKA) Cosmology Science Working Group meeting, Queen Mary University of London, **UK**
- 2nd CANTATA Meeting, Frankfurt Institute for Advanced Studies, **Germany**
- Dark Energy in the Laboratory, Leiden, **Netherlands**
- Dark Energy and Modified-Gravity cosmologies: DARKMOD, CEA Saclay, Paris, **France**
- Tehran Meeting on Cosmology, IPM, **Iran**
- Advances in Theoretical Cosmology in Light of Data, NORDITA, **Sweden**
- Theoretical Approaches to Cosmic Acceleration: Connecting String, Supergravity and Quantum Field Theory Aspects of (Near-) De Sitter Space, Leiden, **Netherlands**
- Euclid Theory Working Group Meeting, Heidelberg, **Germany**
- Physics@Veldhoven, Veldhoven, **Netherlands**

- **2016:**

- 10th TRR33 Winter School on Cosmology (as organizer), Passo del Tonale, **Italy**
- 1st CANTATA Meeting, Lisbon, **Portugal**
- 8th Bethe Center Workshop: Particle Physics meets Cosmology, Bad Honnef, **Germany**
- SW10: Hot topics in Modern Cosmology, Cargese, Corsica, **France**
- Theoretical Cosmology in the Era of Large Surveys, Galileo Galilei Institute, Florence, **Italy**

- **2015:**

- 9th TRR33 Winter School on Cosmology (as organizer), Passo del Tonale, **Italy**
- Planck I&S and CP Meeting, Torun, **Poland**
- Workshop on Particles and Cosmology, Corfu, **Greece**
- Euclid Consortium Meeting 2015, EPFL, **Switzerland**
- Kosmologietag 10, Bielefeld University, **Germany**
- Extended Theories of Gravity, NORDITA, **Sweden**
- Beyond  $\Lambda$ CDM, Oslo, **Norway**

- **2014:**

- PLANCK 2014, Ferrara, **Italy**
- Dark Energy Interactions, NORDITA, **Sweden**
- Planck Joint LFI/HFI meetings, Bologna, **Italy** and Paris, **France**
- NBIA-APCTP Workshop on Cosmology, Copenhagen, **Denmark**
- COSPAR Scientific Assembly, Moscow, **Russia**
- Planck I&S Meeting, Torun, **Poland**
- Euclid Consortium Meeting, Marseille, **France**
- Structure of Gravity and Spacetime, University of Oxford, **UK**

- **2013:**

- COSMO 2013, University of Cambridge, **UK**
- Prospects of Studying Dark Energy, Seoul, **South Korea**
- IEU Cosmology Conference, Seoul, **South Korea**
- Euclid Consortium Meeting, Leiden, **Netherlands**
- The Universe as seen by Planck, ESA/ESTEC, **Netherlands**
- Cosmological Tests of Gravity, University of Oxford, **UK**

- **2012:**

- Modern Cosmology: Early Universe, CMB and LSS, Benasque, **Spain**
- Marcel Grossmann Meeting, Stockholm, **Sweden**
- Recontres Itzykson – Heart of Darkness: Dark Energy and Modified Gravity, IPhT CEA-Saclay, **France**
- Nordic-Baltic Summer School (as lecturer), Onsala, **Sweden**
- Euclid Consortium Meeting, Copenhagen, **Denmark**

- **2011:**

- The Return of de Sitter, NORDITA, **Sweden**
- Global BSM Fits and LHC Data, CERN, **Switzerland/France**

- **2010:**

- Darkness Visible, University of Cambridge, **UK**
- Quarks, Strings and the Cosmos, Stockholm, **Sweden**
- Experimental Search for Quantum Gravity, NORDITA, **Sweden**
- TOOLS 2010, Winchester, **UK**
- Cosmic Ray Backgrounds in Dark Matter Searches, Stockholm, **Sweden**

- **2009:**

- TeV Particle Astrophysics V, SLAC/Stanford, **USA**
- Astroparticle Physics: A Pathfinder to New Physics, NORDITA, **Sweden**

- **2008:**
  - *Biennial Leopoldina Conference on Dark Energy*, Munich, **Germany**
  - *Identification of Dark Matter*, Stockholm, **Sweden**
  - *Summer School on de Sitter Cosmology*, NORDITA, **Sweden**
  - *TeV Scale Physics and Dark Matter*, NORDITA, **Sweden**
  - *Symmetries and Phases in Universe*, Munich, **Germany**
  - *LHC and Beyond*, NORDITA, **Sweden**
- **2007:**
  - *Dark Matter, from the Cosmos to the Laboratory*, SLAC/Stanford, **USA**
  - *Cosmology, Strings, and Phenomenology*, Stockholm, **Sweden**
  - *Winter School in Particle Physics and Cosmology*, Gausdal, **Norway**
- **2006:**
  - *School on Inflation and String Cosmology*, Aarhus, **Denmark**

## TEACHING EXPERIENCE/DUTIES

- **École Normale Supérieure (ENS) [2018-2021]:**
  - **Cosmology** [autumn/winter 2020/2021]
  - **General Relativity** [autumn 2020]
  - **Introduction to Astrophysics** [autumn 2020]
  - **Cosmology** [autumn/winter 2019/2020]
  - **General Relativity** [autumn/winter 2018/2019]
- **Leiden University [2016-2018]:**
  - **Topics in Theoretical Physics (Cosmology)** [spring 2018]
- **Heidelberg University [2014-2016]:**
  - **General Relativity** [spring/summer 2016]
  - **Quantum Field Theory** [winter 2015]
  - **Advanced Cosmology** [spring/summer 2015]
- **Stockholm University [2006-2011]:**
  - **General Relativity** [spring 2010]
  - **Advanced Relativistic Quantum Field Theory** [autumn 2009]
  - **Relativistic Quantum Mechanics** [spring 2009]
  - **Quantum Mechanics III** [autumns 2008, 2009, and 2010]
- **Sharif University of Technology [2003-2006]:**
  - **Advanced Cosmology**
  - **Advanced Electrodynamics**
  - **Advanced Classical Mechanics**
  - **Physics Lab. I and II**
- **Tehran Polytechnic [1998-2003]:** Electromagnetism, Analytical Mechanics, Electrical Measurements and Circuits Lab.
- **LION Summer School: Modern physics at all scales** (invited lecturer) [July 2017], Leiden University.
- **LION Summer School: Modern physics at all scales** (invited lecturer) [July 2018], Leiden University.
- **Cosmology Beyond the Standard Model** (14-hour intensive course; invited lecturer) [December 2016], Tehran, Iran.
- **Nordic-Baltic Summer School** (invited lecturer) [summer 2012], Onsala, Sweden.

## SUPERVISION EXPERIENCE

- **PhD advisor:** Nicolas Chartier; École Normale Supérieure, started in September 2019 (ongoing). Title: “Understanding cosmic origins from galaxy surveys with Likelihood-Free Inference”. Co-supervisors: Benjamin Wandelt (IAP) and Nick Kaiser (ENS). Funding provided by ENS as part of starting grant for my JRC position.
- **Supervisor (MSc, M2 project):** Senwen Deng; École Normale Supérieure, 2021.
- **Supervisor (MSc, M1 project):** Sharon David; Sorbonne Université, 2021.
- **Supervisor (MSc):** Romane Cologni; École Normale Supérieure, 2020/2021.
- **Supervisor (MSc):** Anna Negro; Erasmus student at École Normale Supérieure from University of Padova, Italy, 2020. Co-supervisor: Sabino Matarrese (Padova).
- **Supervisor (MSc):** William Doumerg; École Normale Supérieure, 2019/2020.
- **Supervisor (MSc, M2 project):** Senwen Deng; École Normale Supérieure, 2019.
- **Co-supervisor (PhD):** Valeri Vardanyan; Leiden University, 2016-2019.
- **Co-supervisor (MSc):** Michalis Dagtzis; Leiden University, 2018.
- **Supervisor (MSc):** Jamie Watson; Leiden University, 2017.

- **Co-supervisor (summer project)**: Roohi Dalal (from JPL/Caltech, US); Leiden University, 2017.
- **Co-supervisor (MSc)**: Vida Saeidzadeh, Andia Khosravi, Fereshteh Majidi, Sara Hoseini and Romina Fassihi; Alzahra University, 2016-2018.
- **De facto supervisor (PhD)**: Henrik Nersisyan; Heidelberg University (adviser: Luca Amendola), 2014-2016.
- **Co-supervisor (PhD)**: Frank Könnig; Heidelberg University (adviser: Luca Amendola), 2014-2016.
- **De facto supervisor (MSc)**: Marvin Lüben; Heidelberg University, 2015.
- **De facto supervisor (MSc)**: Supranta Sarma Boruah; Indian Institute of Technology, Kanpur, 2015.
- **Supervision elements for Adam R. Solomon's PhD**; University of Cambridge (adviser: John D. Barrow), 2013-2015.
- **De facto supervisor (PhD)**: Marit Sandstad; University of Oslo (adviser: David Mota), 2011-2014.

## PRIZES, AWARDS AND HONOURS

- 2018 laureate of the prestigious ENS-ICFP Junior Research Chair (JRC) program
- 2019 Giuseppe & Vanna Cocconi and 2018 Gruber Cosmology Prizes (awarded to Planck team)
- German Research Foundation (DFG) funding - Project TRR33 "The Dark Universe", 2014
- Helge Axelsson Johnson Foundation Award, 2010
- Recipient of the competitive HEAC PhD funding, 2006
- Winner of the International Physics and Mathematics Olympiads, country level, 1997/1998

## COMPUTER SKILLS

- *Programming languages*: Fortran, C, Python, IDL • *Computational software*: Mathematica, Maple, MATLAB • *High performance and parallel computing*: MPI, OpenMP • *Cosmological codes and packages*: CAMB, CosmoMC, CLASS, Monte Python, Cobaya, HEALPix, Commander, EFTCAMB, EFTCosmoMC, CosmicFish, hi\_class • *Extensive experience in working with supercomputers, computer clusters, and large data sets*

## COURSES TAKEN DURING PHD

- General Relativity Theory with Cosmology • Cosmology and Astroparticle Physics • Relativistic Quantum Mechanics • Quantum Field Theory • Theory of Supersymmetry • Applications of Supersymmetry • String Theory • Grand Unified Theories • Statistical Methods in Physics • Statistical Physics • Radiation Processes in Astrophysics • High Energy Astrophysics • University Pedagogy.

## PERSONAL INFORMATION

- *Language*: Persian (mother tongue), English (fluent), Norwegian (fair), Swedish (sufficient) • *Hobbies*: dancing, playing violin, music (classical, Persian traditional), fencing, traveling, hiking, reading (literature, philosophy, politics), movies.

## REFERENCES

- Prof. Andrei Linde, Stanford University, USA, +1 650 723-2687 and +1 650 494-6106, alinde@stanford.edu  
 Prof. Renata Kallosh, Stanford University, USA, +1 650 725-4736, kallosh@stanford.edu  
 Prof. Nicholas Kaiser, ENS, France, +33 (0)1 44 32 33 67, nick.kaiser@ens.fr  
 Prof. Luca Amendola, ITP Heidelberg, Germany, +49 6221 54-9407, l.amendola@thphys.uni-heidelberg.de  
 Prof. Anne-Christine Davis, DAMTP, University of Cambridge, UK, +44 1223 337878, acd@damtp.cam.ac.uk  
 Prof. Benjamin D. Wandelt, IAP, France, +33 (0)1 44 32 81 43, bwandelt@iap.fr  
 Prof. Martin A. Bucher, CNRS/APC, France, +33 (0)1 57 27 69 43, bucher@apc.univ-paris7.fr  
 Prof. David F. Mota, ITA Oslo, Norway, +47 22 85 75 81, d.f.mota@astro.uio.no  
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 Prof. Joseph Silk, IAP, France, +33 (0)1 44 32 80 54, silk@iap.fr  
 Prof. Edvard Mörtzell, OKC Stockholm, Sweden, +46 8 5537 8535, edvard@fysik.su.se  
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 Prof. Frode Kristian Hansen, ITA Oslo, Norway, +47 22 85 65 16, f.k.hansen@astro.uio.no  
 Prof. Anthony Banday, IRAP Toulouse, France, +33 (0)5 61 55 77 78, anthony.banday@irap.omp.eu  
 Prof. Krzysztof M. Gorski, JPL/Caltech, USA, +1 818 393 5931, krzysztof.m.gorski@jpl.nasa.gov