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IA-FORTH History & Goals

Founded in 2018 after a 20+ years of successful astrophysics activities within IESL-FORTH

➤ Targeted Scientific Research

- ✓ Theoretical Astrophysics (compact objects, high-energy astrophysics, ISM physics, cosmology, astrostatics)
- ✓ Observational Astrophysics (ground based and space born)

➤ Major Research Infrastructures

- ✓ Skinakas Observatory - @1750m altitude, ~50km from Heraklion
- ✓ High Performance Computing cluster “Metropolis” of the Dept. of Physics

➤ Education and Public Outreach

- ✓ Training of students and postdocs to address key outstanding problems in astrophysics
- ✓ Organizing astronomy stargazing PO events across Crete – engaging public in science
- ✓ Directly involved in influencing astronomy & STEM curricula in K-12 levels

➤ Small in size - Emphasis on Excellence – “Boutique” Institute

IA-FORTH Today

“Confidence is contagious. So is lack of confidence.”
- Vince Lombardy

IA-FORTH Personnel & Key Figures

➤ **Current Permanent Personnel [9]**

- ✓ 4 Researchers (1 funded by ERC) & 5 UoC Affiliated Faculty **[+3 since part of IESL]**
- ✓ 1 Engineer & 1 UoC dedicated technician for Skinakas Observatory

➤ **Current Soft Money Personnel**

- ✓ 1 IT support & 2 Observatory support & 1 Public Outreach & 1 Secretary
- ✓ 7 postdoctoral researchers + 1 visiting postdoc
- ✓ 13 PhD students – 3 MSc students – 12 Undergrads

➤ **Scientific Output & international recognition (over the past 17 years: 2005-2021)**

- ✓ 734 refereed papers (3 in Nature & 2 in Science)
- ✓ Awarded 3 ERC Grants (+3 other scientists graded A but not funded: 80% of hires since 2008)
- ✓ Awarded ~10.3MEuros in competitive funding (EC, ESA, Greece) & 1.8MEuros in donations
- ✓ Most citations per astrophysics researcher in Greece (including top-2 most cited)
- ✓ Trained 19 PhD students + 31 postdocs (21 in perm. acad. positions: 15 outside Greece)

IA-FORTH Personnel

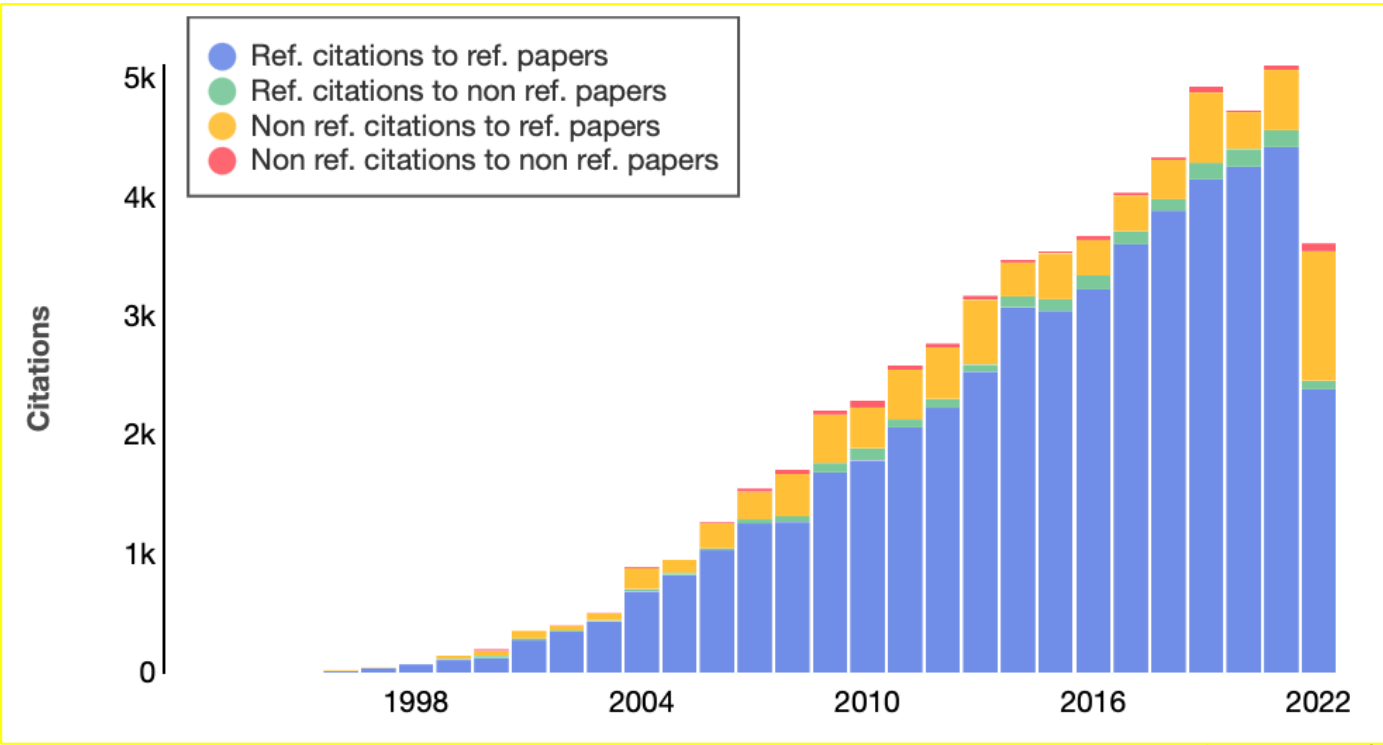
➤ Current Permanent Research Personnel [9]

- ✓ I. Papadakis (2001-): PhD 1992 @QMW Univ. of London, UK
- ✓ P. Reig (2004-): PhD 1996 @Univ. of Valencia, Spain
- ✓ V. Charmandaris (2005-): PhD 1995 @Iowa State Univ., USA
- ✓ A. Zezas (2008-): PhD 2002 @Univ. of Leicester, UK
- ✓ V. Pavlidou (2012-): PhD 2005 @Univ. of Illinois Urbana-Champaign, USA
- ✓ K. Tassis (2012-): PhD 2005 @Univ. of Illinois Urbana-Champaign, USA
- ✓ T. Diaz Santos (2020-): PhD 2009 @Univ. Complutense Madrid, Spain
- ✓ J. Antoniadis (2021-): PhD 2013 @Univ. of Bonn, Germany
- ✓ C. Casadio (2022-): PhD 2016 @Univ. of Granada, Spain

➤ Emeriti IA Fellows

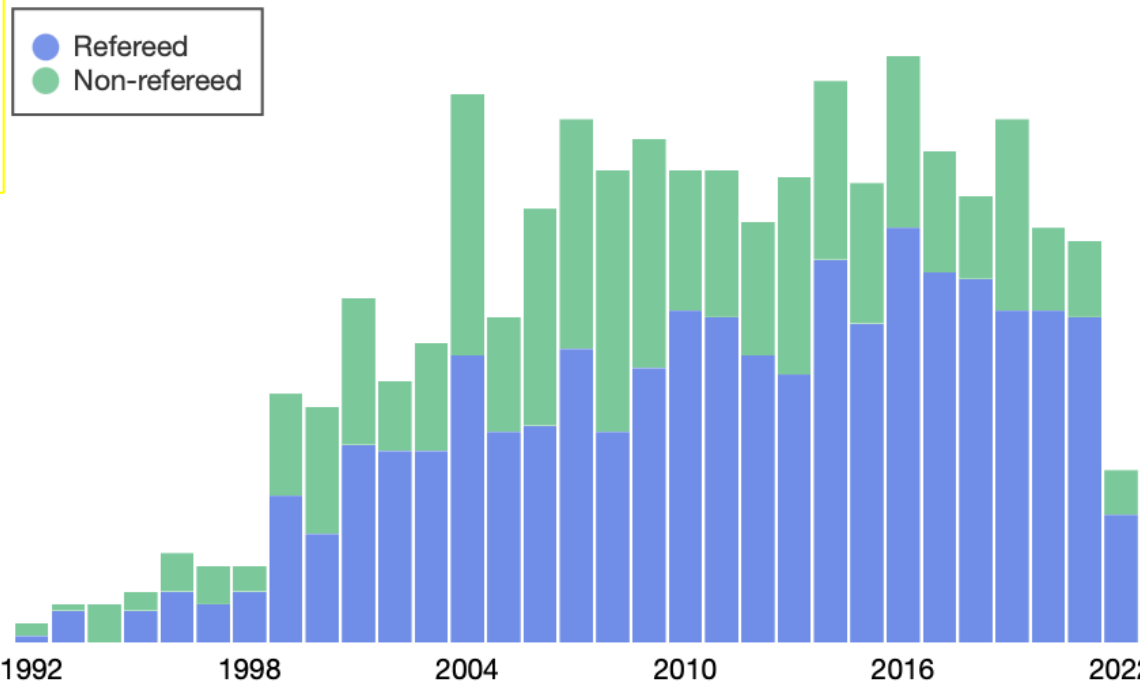
- ✓ Prof. I. Papamastorakis (1985-2009): PhD 1975 @Technical Univ. of Munich, Germany
 - ✓ Founding Director of Skinakas Observatory
- ✓ Prof. N. Kylafis (1985-2016): PhD 1978 @Univ. of Illinois Urbana-Champaign, USA
 - ✓ Supervise students & have access to facilities
 - ✓ Provide valuable advice to the Director to steer away from trouble...

IA-FORTH Personnel – Career Bibliometric figures



➤ Current Permanent Researchers (9)

- ✓ **Refereed Papers:** 1053 (~6/person/year)
- ✓ **Citations:** 56,500 (~550/person/year)
- ✓ **Median age:** 45 years



➤ High Impact Papers (last 5 years):

- ✓ 3 Science (2 in 2018, 2019)
- ✓ 3 Nature/NatureAst (2017, 2020, 2022)

➤ Journal Distribution:

- ApJ: 32%, ApJL: 7%, ApJSup: 6%
- A&A: 23%, MNRAS: 16%

IA-FORTH – Main research areas

➤ **Theoretical Astrophysics**

- ✓ Astrophysics of ultra-high-energy cosmic rays
- ✓ Anomalous X-ray pulsars
- ✓ Modeling emission from X-ray binaries (NS or BH) as well as X-ray binary populations
- ✓ Modeling of magnetic fields in the ISM and molecular clouds
- ✓ Large scale structure formation in the Universe
- ✓ Astrostatistics

➤ **Observational Astrophysics**

- ✓ Formation and Evolution of Compact Objects
- ✓ X-ray variability of X-ray binaries & AGN
- ✓ Polarization of ISM at low extinction regions & tomographic mapping of Galactic ISM
- ✓ X-ray source populations in nearby galaxies
- ✓ Mid-/Far-Infrared studies of LIRGs at low and high-z
- ✓ Multiwavelength studies of interacting galaxies
- ✓ Radio & mm VLBI

IA-FORTH – PhD Student / Postdoc Training

➤ **Trained 19 PhD students (3 women + 1 has just graduated)**

- ✓ Four are in permanent/tenure track positions in academia
 - ✓ Two in the US (D. Giannios, Asc. Prof. at Purdue & V. Antoniou, Ast. Prof at Texas Tech)
- ✓ G. Panopoulou awarded IAU (Div. H) 2017 best PhD Thesis (now Hubble Fellow @ Caltech), as well as shared Young Researcher Award of UoC in 2017
- ✓ I. Liodakis, shared Young Researcher Award of UoC in 2017, best PhD thesis of Hel.A.S. in 2017, moved to Stanford and IAU Gruber fellowship in 2021.
- ✓ A. Tritsis, awarded EAS Thesis Merac Prize in 2020 (onto Ambizione Fellowship at EPFL)
- ✓ K. Kowlakas (PhD 2020), awarded a 2021 Swiss Government Excellence Scholarship.

➤ **Trained 31 postdocs (13 women)**

- ✓ Sixteen (5 women) are currently on permanent positions in academia
- ✓ Eight of them are in permanent positions outside Greece (Australia, France, USA, Mexico)

➤ **Full record of Astrophysics People at IESL/FORTH & IA/FORTH**

- ✓ We honor the past to build a tradition which will shape our future.
- ✓ Basilis Xanthopoulos Archives: <https://xanthopoulos.physics.uoc.gr>
- ✓ Complete information: https://www.ia.forth.gr/past_members

IA-FORTH - Strategic Collaborations

➤ Strategic Collaborations within FORTH/UoC

- ✓ Univ. of Crete: Operation of Skinakas Observatory
- ✓ FORTH-IESL: Context of EuroQCI and ESA/Scylight initiatives
- ✓ FORTH-ICS: Signal Processing Lab and Astrostatistics & Astroinformatics Initiatives
Submitted in 2022 an ERA Chair for Dr. Jean-Luc Starck (CEA/Saclay)
- ✓ FORTH-IACM: Context of advanced computational algorithms, sparse inverse problems

➤ Strategic Collaborations with external Institutes

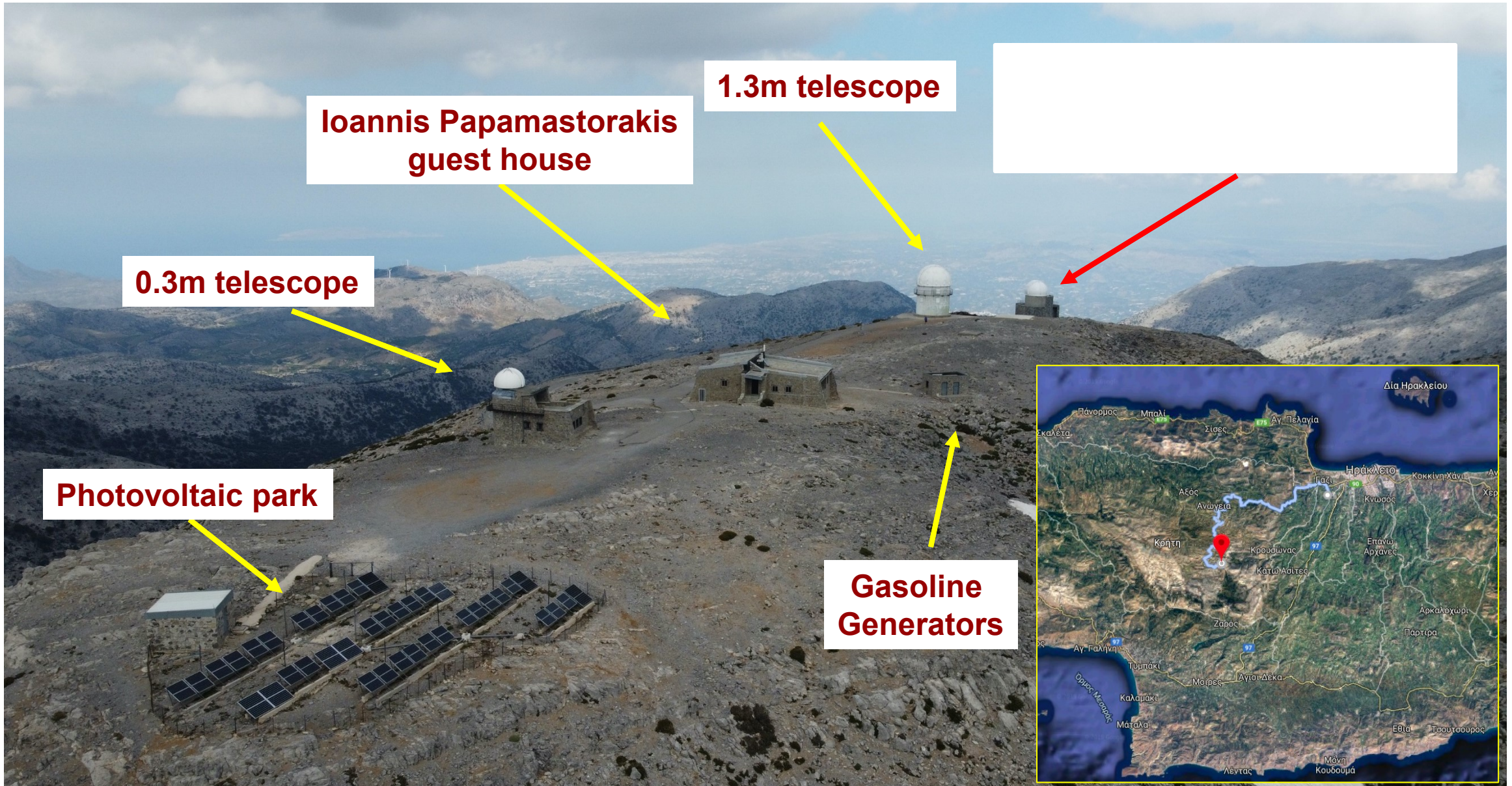
- ✓ Caltech: Context of Robopol, PASIPHAE, SMILE
- ✓ Univ. Minnesota: Context of TURBO
- ✓ Cambridge: Applications of GAIA under the auspices of GAPSTI – Impact for Greece
- ✓ Additional long term science collaborations with CfA/Harvard, Northwestern, CEA/Saclay, MPIfR, Oxford, Imperial, Geneva Obs., (etc) in EU funded research projects



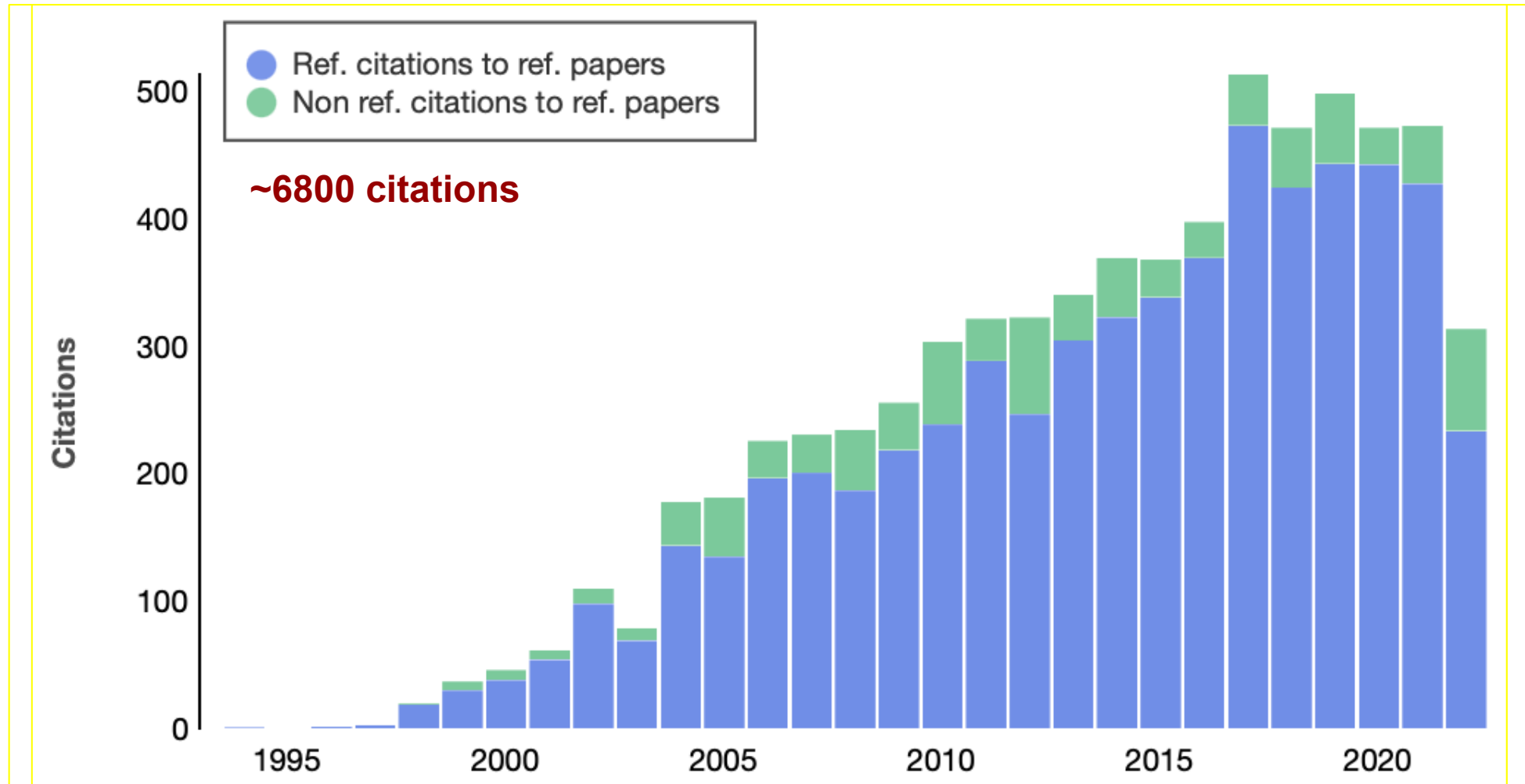
➤ Strategic Collaborations with other stakeholders

- ✓ Town of Anogeia: Involve infrastructure at Skinakas in astrotourism activities.

IA-FORTH – Skinakas Observatory

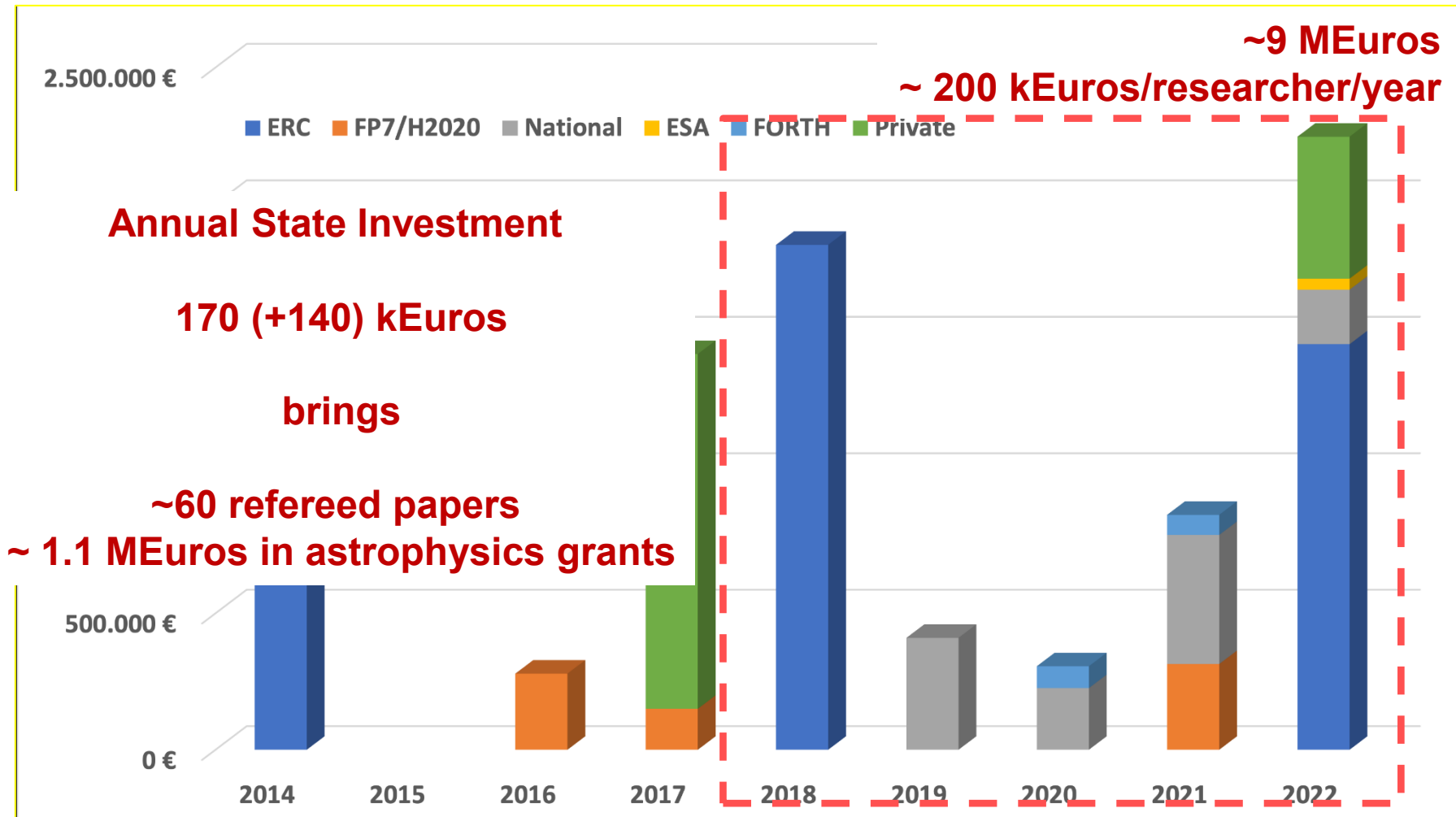


IA-FORTH – Skinakas Publications



A total of 254 refereed papers (~10 per year) + 15 PhD theses
<https://skinakas.physics.uoc.gr/en/index.php/research>

IA-FORTH – Grants Awarded



- ✓ Since 2018: Submitted 51 proposals, 11 accepted (22%), 10 pending
- ✓ IA-FORTH overheads: 5% to 15%

IA-FORTH In the future

“It’s hard to predict things especially if they pertain to the future”
- Laurence (aka Yogi) Bera

IA-FORTH – Vision

➤ Our 4 year vision as an independent Institute:

- ✓ Continue producing excellent science
- ✓ Our infrastructure at Skinakas Observatory is contributing in a substantive manner to key problems of time domain astrophysics and optical polarimetry (novel discovery windows)
- ✓ Double the investments from 4MEuros to 8MEuros over the next two years
 - ✓ Instruments: new optical telescope (1.0m diameter) + TURBO (time domain)
 - ✓ Buildings: Visitor Center («Αστεροσχολείο»)
 - ✓ Infrastructure: Repair road to Skinakas Peak, connect with electricity & fiber optic network
- ✓ Expanding the field of AstroInformatics (ERA Chair of Dr. J-L. Starck - synergy with FORTH-ICS)
- ✓ Direct involvement to EU-SST, EuroQCI & ESA ScyLight (FORTH-ICS & FORTH-IESL synergies)
- ✓ Recruit new high-quality researcher hires (use ERC to tenure researcher path)
- ✓ Recruit more engineers in permanent positions
- ✓ **IA-FORTH is established as THE place in Greece where high quality, young and ambitious astrophysicists chose to build their career and have an international impact.**

IA-FORTH: The sky is not our limit...



A bright future for Astrophysics in Greece