



## COSMO21 Slides

- Most of the slides are available at <https://indico.in2p3.fr/event/32548/>

## COSMO21 Pictures

- Thanks to Arnab, all COSMO21 pictures available at the google drive link we sent you by email.

## Summer School

- We discussed during COSMO21 about a new **Astronomical Data Analysis (ADA XI) in Cyprus** in Sept 2025.

## Conference

Sept 17-20 2025 : CASTLE - Cosmological and Astrophysical Synergies: Tactics for the Latest Era'.  
<https://agenda.infn.it/event/41709/>

## Jobs

- **One PhD or postdoc position** open in 2024 at FORTH in the TITAN project.
- **Two Euclid-LE3 postdoc positions** should normally be open before the end of 2024 at CEA Saclay in the CosmoStat laboratory (CEA Saclay)
- A **permanent AstroStat research position** should be open in 2025 or in 2026 at FORTH Computer Science Institute.



## 2024: Machine learning, Higher Order Statistics, and Simulation Based Inference, mainly surveys (especially weak lensing)

- 15 talks on machine learning/NN
- 5 talks on Bayesian statistics
- SBI session, map level inference, etc

- 1) **Consensus:** More consensus than before (SBI, LFI, HOS)
- 2) **HOS:** Start to have some comparison between HOS methods.
  - > **Need more.**
  - > Also NN shows better performance than second order stat, **as any HOS.**
  - > Many talks/paper on scattering transform, interesting but how well does it perform compared to standard HOS ?
- 4) **NN as a standard tool for dimensionality reduction:** NN is now used as a standard statistical tool to reduce the dimensionality and extract physical information.
- 5) **Simulations** become more important than before, as simulation are now fully part of the processing pipeline. A lot work will have to be done to verify that fast simulations are accurate enough for stage 4 surveys.
- 6) **The limit** of a full simulation based inference is not yet established. Some processing step may require expertise hard to be put in a NN.
- 7) **Reproducible research:** in progress, but not yet at the level it should be.



- 1) Full HOS comparison
- 2) More statistical modelling
- 3) More transformer NN
- 4) Pay more attention to model misspecification.
- 5) More work on interpretability.

And we cross the fingers for more Reproducible Research.

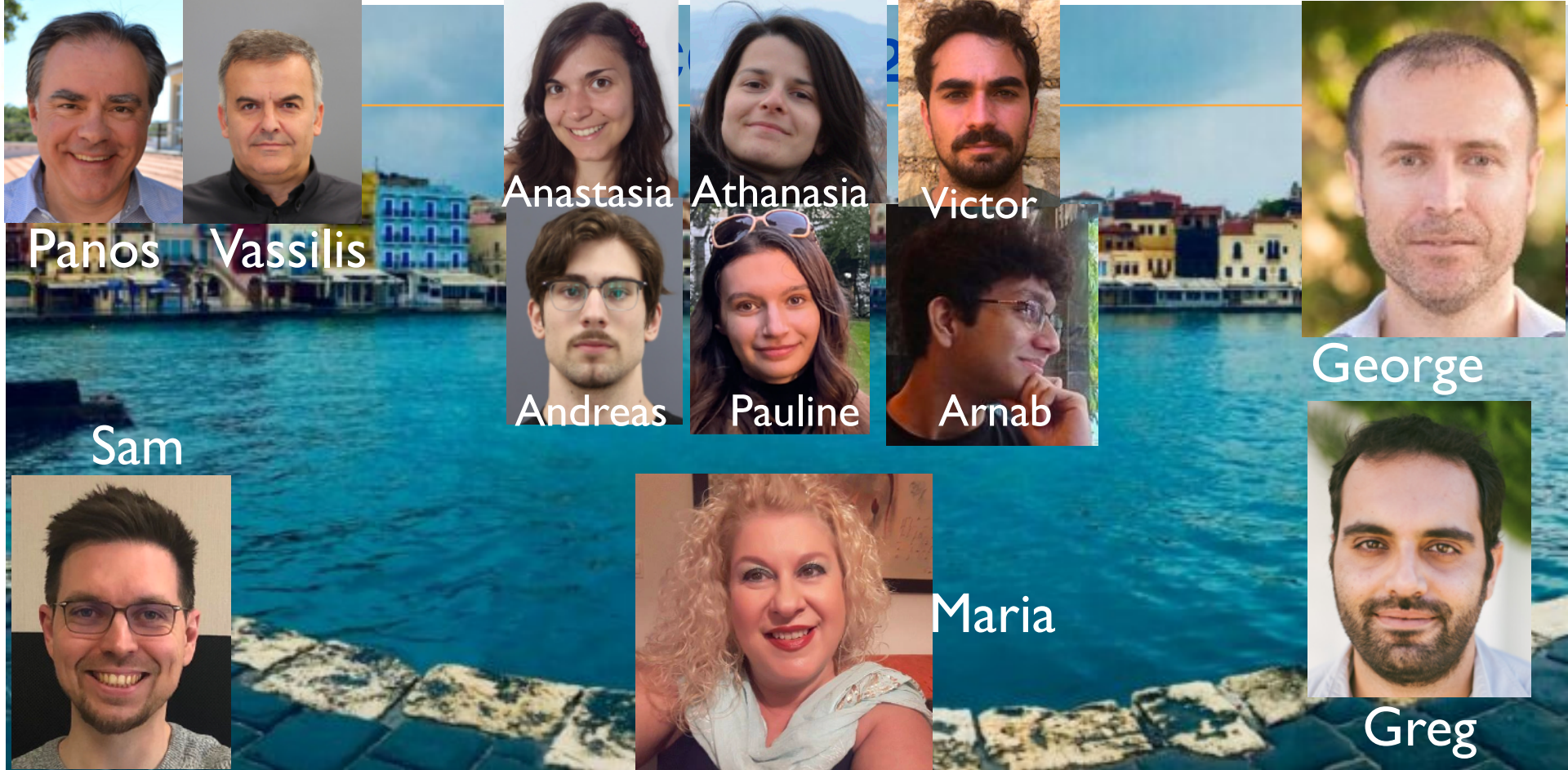


# Euclid DR1 2026 Cosmologist Result Prediction



- Second order statistics **confirms I-CDM**
- NN HOS + Simulation Based Inference **rejects I-CDM** at a level between 2.5 and 3 sigma depending on the modelling for systematics.
- In addition to the late versus early universe tension, we have now **a NN / second order statistics tension.**
- Our prediction is that this tension will keep astrophysiciens busy **for at least 15 years.**
- **COSMO21 in 2040 will definitely close the debate.**





<https://spl.ics.forth.gr/titan>









Elena







**Τους γαλαξίες τ' ουρανού  
κι όλης της γης της γνώση  
το cosmo21  
μαζί έχει ενώσει.**

**Cosmo21 has brought together  
the galaxies in the sky and the entire world's knowledge.**  
which stands for

**Eleni Tsaprazi**