Dr. Georgios Valogiannis

Office 521
Department of Astronomy and Astrophysics
University of Chicao
Chicago, Illinois, USA
Website: https://scholar.harvard.edu/gvalogiannis/home
Email: gvalogiannis@uchicago.edu

Academic and Professional Positions

September 2023 – *Present*	**Eric and Wendy Schmidt AI in Science Postdoctoral Fellow,** Department of Astronomy and Astrophysics, University of Chicago, IL, USA.
September 2020 – August 2023	**Postdoctoral Research Fellow,** Department of Physics, Harvard University, Cambridge, MA, USA. PI: Prof. Cora Dvorkin

Education

August 2014 – August 2020	**P.hD. Astronomy,** Department of Astronomy, Cornell University, Ithaca, NY, USA. • Thesis title: "Testing Gravity with Cosmology: Efficient simulations, Novel Statistics and Analytical Approaches" Advisor: Prof. Rachel Bean
May 2017	**M.Sc. Astronomy,** Department of Astronomy, Cornell University, Ithaca, NY, USA. Advisor: Prof. Rachel Bean
September 2009 – March 2014	**B.Sc. Physics,** Aristotle University of Thessaloniki, Thessaloniki, Greece. • Thesis title: "Equilibrium Models of Magnetized Tori around Rotating Black Holes" Advisor: Prof. Nikolaos Stergioulas, Grade: 10/10 Final Grade: 9.54/10 1^{st} place in Physics class of 2014
September 2006 – July 2009	**Lyceum** Alexandros Papadiamantis, Trikala, Greece. Final Grade: 19.8/20 1^{st} place in class of 2009

COLLABORATIONS

2016	**Large Synoptic Survey Telescope Dark Energy Science Collaboration (LSST DESC)** - Full Member

Present | Leader of Beyond-$w(z)$CDM Projects Topical Team (2020-present)
| Theory and Joint Probes (TJP) working group

2016 | **Dark Energy Scientific Instrument (DESI) Collaboration**
Present | Galaxies & Quasars Clustering (GQC) working group
| Clustering, Clusters, and Cross-correlation (C^3) working group

2016 | **Euclid Consortium (EC)**
2020 | Theory Working Group (TWG)
| Cosmological Simulations (CosmoSim) working group

2019 | **Nancy Grace Roman Space Telescope**
2020 | High Latitude Survey (HLS)

2020 | **Institute for Artificial Intelligence and Fundamental Interactions (IAIFI)**
Present | Affiliate postdoctoral researcher

Publications

(* Student co-supervised)

1. **G. Valogiannis** & C. Dvorkin, "*Going Beyond the Galaxy Power Spectrum: an Analysis of BOSS Data with Wavelet Scattering Transforms*",
Phys. Rev. D 106, 103509 (2022), arXiv:2204.13717.

2. **G. Valogiannis** & C. Dvorkin, "*Towards an optimal estimation of cosmological parameters with the wavelet scattering transform*",
Phys. Rev. D 105, 103534 (2022), arXiv:2108.07821.

3. B. S. Wright, A. S. Gupta, T. Baker & **G. Valogiannis**, "*Hi-COLA: Fast, approximate simulations of structure formation in Horndeski gravity*",
JCAP in press (2022), arXiv:2209.01666.

4. *M. Howard, A. Kosowsky & **G. Valogiannis**,"*Galaxy Cluster Statistics in Modified Gravity Cosmologies*",
Under review in Phys. Rev. D (2022), arXiv:2205.13015.

5. L. Vazsonyi, P. L. Taylor, **G. Valogiannis**, N. S. Ramachandra, A. Ferté & J. Rhodes, "*Constraining f(R) gravity with a k-cut cosmic shear analysis of the Hyper Suprime-Cam first-year data*",
Phys. Rev. D 104, 083527 (2021), arXiv:2107.10277.

6. *R. Liu , **G. Valogiannis** et al.,"*Constraints on f(R) and normal-branch Dvali-Gabadadze-Porrati modified gravity model parameters with cluster abundances and galaxy clustering*",
Phys. Rev. D 104, 103519 (2021), arXiv:2101.08728.

7. A. Aviles, **G. Valogiannis** et al.,"*Redshift space power spectrum beyond Einstein-de Sitter kernels*",
JCAP 04 (2021) 039, arXiv:2012.05077.

8. S. Alam et al. (including **G. Valogiannis**), "*Towards testing the theory of gravity with DESI: summary statistics, model predictions and future simulation requirements*",
JCAP 11 (2021) 11, 050, arXiv:2011.05771.

9. N. Ramachandra, **G. Valogiannis** et al.,"*Matter Power Spectrum Emulator for f(R) Modified Gravity Cosmologies*",
Phys. Rev. D 103, 123525 (2021), arXiv:2010.00596.

10. **G. Valogiannis**, R. Bean & A. Aviles,"*An accurate perturbative approach to redshift space clustering of biased tracers in modified gravity*",
JCAP 01 (2020) 055, arXiv:1909.05261.

11. M. Ishak, T. Baker, P. Bull, E. M. Pedersen, J. Blazek, P. G. Ferreira, C. D. Leonard, W. Lin, E. Linder, K. Pardo & **G. Valogiannis**, "*Modified Gravity and Dark Energy models Beyond w(z)CDM Testable by LSST*",
(2019), arXiv:1901.03763.

12. **G. Valogiannis** & R. Bean,"*Convolution Lagrangian perturbation theory for biased tracers beyond general relativity*",
Phys. Rev. D 99, 063526 (2019), arXiv:1901.03763.

13. **G. Valogiannis** & R. Bean,"*Beyond δ: Tailoring marked statistics to reveal modified gravity*",
Phys. Rev. D 97, 023535 (2018), arXiv:1708.05652

14. **G. Valogiannis** & R. Bean, "*Efficient simulations of large scale structure in modified gravity cosmologies with COLA*",
Phys. Rev. D 95, 103515 (2017), arXiv:1612.06469

Scholarships and Awards

March 2021	Best PhD thesis Prize - Emilios Harlaftis Awarded by the Hellenic Astronomical Society (Hel.A.S.)
October 2019	Best of Posters Award Cosmic Controversies Conference, University of Chicago/KICP, IL, USA
February 2017	LSST Dark Energy Science Collaboration (DESC) Travel grant DESC Collaboration meeting at SLAC National Accelerator Laboratory, CA
July 2010	Graduated 1^{st} in overall class in academic years 2009-2012 (State Scholarship Foundation (I.K.Y.) Scholarship of Excellence Holder)
Oct. 2009	1^{st} Winner Team competition 3^{rd} International Olympiad on Astronomy & Astrophysics, Tehran, Iran
Oct. 2009	Entered Physics Department 1^{st} in overall class (State Scholarship Foundation (I.K.Y.) Scholarship of Excellence Holder)
Mar. 2009	1^{st} Winner National Olympiad on Astronomy & Astrophysics, Volos, Greece
Aug. 2008	Honorable mention 2^{nd} International Olympiad on Astronomy & Astrophysics, Bandung, Indonesia

Invited Colloquia & Seminars

- (Invited) "*Going Beyond the Galaxy Power Spectrum: an Analysis of BOSS Data with Wavelet Scattering Transforms*", Yale University, March 2023,
Astro x Data Science Seminar,
New Haven, CT, USA

- (Invited) "*Going Beyond the Galaxy Power Spectrum: an Analysis of BOSS Data with Wavelet Scattering Transforms*", Johns Hopkins University, September 2022,
Particle Theory Seminar,
Baltimore, MD, USA

- (Invited) "*Going Beyond the Galaxy Power Spectrum: an Analysis of BOSS Data with Wavelet Scattering Transforms*", Euclid Consortium, June 2022,
Additional Galaxy Clustering Probes Working Group telecon - Virtual

- "*Going Beyond the Galaxy Power Spectrum: an Analysis of BOSS Data with Wavelet Scattering Transforms*", Harvard Center for Astrophysics (CfA), June 2022,

Eisenstein Group meeting,
Cambridge, MA, USA

- (Invited) "*Going Beyond the Galaxy Power Spectrum: an Analysis of BOSS Data with Wavelet Scattering Transforms*", École Normale Supérieure (ENS), May 2022,
Theoretical Astrophysics Seminar - Virtual

- (Invited) "*Going Beyond the Galaxy Power Spectrum: an Analysis of BOSS Data with Wavelet Scattering Transforms*", Institute of Advanced Study (IAS), May 2022,
Cosmology Journal Club - Virtual

- (Invited) "*Towards an optimal estimation of cosmological parameters with the wavelet scattering transform*", Stanford University, January 2021,
Abel Group meeting - Virtual

- "*Testing gravity with cosmology: efficient simulations, novel statistics and analytical approaches*",
Princeton University, November 2019,
Princeton, NJ, USA

- "*Testing gravity with cosmology: efficient simulations, novel statistics and analytical approaches*",
Carnegie Mellon University, October 2019,
Pittsburgh, PA, USA

- "*Testing gravity with cosmology: efficient simulations, novel statistics and analytical approaches*",
Argonne National Lab, October 2019,
Chicago, IL, USA

- "*Testing gravity with cosmology: efficient simulations, novel statistics and analytical approaches*",
Harvard Institute for Theory and Computation, September 2019,
Cambridge, MA, USA

- "*Testing gravity with cosmology: efficient simulations, novel statistics and analytical approaches*",
Berkeley Center for Cosmological Physics, September 2019,
Berkeley, CA, USA

- "*Testing gravity with cosmology: efficient simulations and novel statistics*", Institute of Cosmology and Gravitation, April 2018,
Portsmouth, UK

- "*Testing gravity with cosmology: efficient simulations and novel statistics*", University College London, April 2018,
London, UK

- "*Testing gravity with cosmology: efficient simulations and novel statistics*", Durham University, April 2018,
Durham, UK

Conference Presentations

Talks

- "*Cosmological Constraints from DESI data using the Wavelet Scattering Transforms*", DESI Collaboration Meeting, December 2022,
Cancun, Mexico

- "*Going Beyond the Galaxy Power Spectrum: an Analysis of BOSS Data with Wavelet Scattering Transforms*", VIII Essential Cosmology for the Next Generation, November 2022,
Playa del Carmen, Mexico

- "*Going Beyond the Galaxy Power Spectrum: an Analysis of BOSS Data with Wavelet Scattering Transforms*", Berkeley Center for Cosmological Physics summer workshop, July 2022,
  Vipolze, Slovenia
- "*Going Beyond the Galaxy Power Spectrum: an Analysis of BOSS Data with Wavelet Scattering Transforms*", Cosmology from Home, July 2022,
  Virtual
- "*Going Beyond the Galaxy Power Spectrum: an Analysis of BOSS Data with Wavelet Scattering Transforms*", DESI Collaboration Meeting, June 2022,
  Berkeley, CA, USA
- (Invited) "*Testing gravity with cosmology: efficient simulations, novel statistics and analytical approaches*", 15^{th} Hellenic Astronomical Conference, July 2021,
  Best PhD thesis Prize Presentation - Virtual
- (Invited) "*Testing gravity with cosmology: efficient simulations, novel statistics and analytical approaches*", Dutch Theoretical Cosmology Meeting, April 2021,
  Virtual
- "*Matter power spectrum emulator for $f(R)$ modified gravity cosmologies*", Dark Energy Science Collaboration Summer Virtual meeting, July 2020
- "*An accurate model for redshift space clustering of biased tracers in modified gravity theories*", Best of posters presentation, Cosmic Controversies Conference, October 2019, University of Chicago/KICP, IL, USA
- "*Modeling redshift-space distortions for biased tracers in modified gravity*", DESI Collaboration Meeting, July 2019,
  Lawerence Berkeley National Lab, Berkeley, CA, USA
- "*Convolution LPT for biased tracers in modified gravity*", LSST DESC Winter Meeting, March 2019,
  UC Berkeley, Berkeley, CA, USA
- "*Testing gravity with cosmology: efficient simulations and novel statistics*", Euclid Cosmological Simulations Meeting, October 2018,
  ICE, Barcelona, Spain
- "*Beyond δ: tailoring marked statistics to reveal modified gravity*", Statistical challenges for large-scale structure in the era of LSST, April 2018,
  University of Oxford, UK
- "*Beyond δ: tailoring marked statistics to reveal modified gravity*", LSST DESC Winter Meeting, February 2018,
  SLAC, CA, USA
- "*Efficient simulations in modified gravity cosmologies with COLA*", Euclid Consortium Meeting, June 2017,
  University College London, UK

Posters

- "*An accurate model for redshift space clustering of biased tracers in modified gravity theories*", Cosmic Controversies Conference, October 2019, University of Chicago/KICP, IL, USA
- "*Beyond δ: tailoring marked statistics to reveal modified gravity*", COSMO 21 Conference, June 2018,
  Valencia, Spain

- "*Beyond δ: tailoring marked statistics to reveal modified gravity*", LSST DESC Winter Meeting, February 2018,
  SLAC, CA, USA
- "*Beyond δ: tailoring marked statistics to reveal modified gravity*", American Astronomical Society Winter Meeting, January 2018,
  Washington DC, USA

Mentoring & Teaching Experience

Mentoring

Spring 2020 – Present	**Graduate Thesis Supervisor,** Department of Physics and Astronomy, University of Pittsburgh, Pittsburgh, PA, USA "*Galaxy Cluster Statistics in Modified Gravity Cosmologies*", Marcell Howard
Spring 2019 – Present	**Undergraduate Thesis Supervisor,** Department of Astronomy, Cornell University, Ithaca, NY, USA. "*Forecasting gravity constraints with DESI/CMB*", Rayne Liu
Spring 2017	**Undergraduate Thesis Supervisor,** Department of Astronomy, Cornell University, Ithaca, NY, USA. "*Marked Correlation Statistics for Modified Gravity*", Avirukt Mittal

Teaching

Fall 2014	**Teaching Assistant,** Department of Astronomy, Cornell University, Ithaca, NY, USA. "Introduction to Astronomy 1101"
Spring 2015	**Teaching Assistant,** Department of Astronomy, Cornell University, Ithaca, NY, USA. "Introduction to Astronomy 1102"
Fall 2016	**Teaching Assistant,** Department of Astronomy, Cornell University, Ithaca, NY, USA. "Introduction to Astronomy 1101"
Spring 2017	**Guest Lecturer,** Department of Astronomy, Cornell University, Ithaca, NY, USA. "Introduction to Modern Cosmology", Astro 4433
June 2010 – June 2013	**Teaching Volunteer,** Volos, Greece Greek Astronomy Association • Teaching and preparation of the national team of Astrophysics, for participation in International Olympiad on Astronomy and Astrophysics (China 2010, Poland 2011, Brazil 2012, Greece 2013)

Grading

Spring 2012	**Grader at Aristotle University** "Introduction to Modern Astronomy"
July 2013	**Academic Personnel**, Volos, Greece International Olympiad on Astronomy and Astrophysics (IOAA) • Member of the Academic Committe in IOAA 2013 (Volunteer Jury) • Grading all parts of the exam and examining students on the observational part of the exam

Service & Volunteering

Reviewing Service

- Monthly Notices of the Royal Astronomical Society
- Physical Review D
- The Astrophysical Journal

Professional Service

- Member of LSST Dark Energy Science Collaboration (DESC) membership committee (2021-present)
- Co-organizer of Harvard Cosmology Journal Club (2021-present)

Volunteering Service

- Volunteer in public outreach astronomy event for August 2017 solar eclipse, Fuertes Observatory, Cornell, Ithaca, NY, USA
- Volunteer for teaching and preparation of the Greek national team of Astrophysics, for participation in International Olympiad on Astronomy and Astrophysics (China 2010, Poland 2011, Brazil 2012, Greece 2013)
- Answering questions for "Ask an Astronomer" Cornell Outreach website
- Organizer of local public outreach astronomy event, May 2013, Trikala, Greece

Public Codes

- Public matter power spectrum emulator for modified gravity theories https://github.com/LSSTDESC/mgemu & https://zenodo.org/record/4058880#.Y0W80uzMIkg
- Public C++ code for calculation of Lagrangian perturbation theory kernels and two-point statistics for halos in various modified gravity theories https://github.com/CornellCosmology/bias_MG_LPT_products
- Public C++ code for calculation of the anisotropic redshift-space two-point function of halos in various modified gravity theories, using the Gaussian Streaming Model https://github.com/CornellCosmology/GSM_MG_products

Skills

Computer Skills

Programming Languages:	C/C++, Python, Fortran
Mathematical Computing:	Mathematica, Matlab
Operating systems:	OS X, LINUX
Text processing:	LaTeX, MS Word

Languages

Greek: Native speaker English: Proficient user German: Independent user

References

Prof. Rachel Bean
Professor
Department of Astronomy
Cornell University
Ithaca, NY, 14853, USA
rbean@astro.cornell.edu

Prof. Cora Dvorkin
Associate Professor
Department of Physics
Harvard University
Cambridge, MA, 02138, USA
cdvorkin@g.harvard.edu

Prof. Mustapha Ishak(-Boushaki)
Professor
Department of Physics
University of Texas at Dallas
Richardson, TX, 75080, USA
mishak@utdallas.edu

Prof. Baojiu Li
Professor
Institute for Computational Cosmology
Durham University
Durham, UK
baojiu.li@durham.ac.uk