Dr. Georgios Valogiannis

Jefferson Physical Laboratory
Department of Physics
Harvard University
Cambridge, Massachussets, USA
gvalogiannis@g.harvard.edu

Academic and Professional Positions

September 2020 – *Present*	**Post-Doctoral Research Fellow,** Department of Physics, Harvard University, Cambridge, MA, USA. Postdoctoral Advisor: 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 – *Present*	**Large Synoptic Survey Telescope Dark Energy Science Collaboration (LSST DESC)** Leader of Beyond-$w(z)$CDM Projects Topical Team Theory and Joint Probes (TJP) working group

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

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

2019 | **Wide-Field Infrared Survey Telescope (WFIRST)**
2020 | |High Latitude Survey (HLS)

Publications

Peer Reviewed Publications

- **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
- **G. Valogiannis** & R. Bean,"*Beyond δ: Tailoring marked statistics to reveal modified gravity*", Phys. Rev. D 97, 023535 (2018), arXiv:1708.05652
- **G. Valogiannis** & R. Bean,"*Convolution Lagrangian perturbation theory for biased tracers beyond general relativity*",
Phys. Rev. D 99, 063526 (2019), arXiv:1901.03763.
- **G. Valogiannis**, R. Bean & A. Aviles,"*An accurate perturbative approach to redshift space clustering of biased tracers in modified gravity*",
Journal of Cosmology and Astroparticle Physics, JCAP01(2020)055 (2020), arXiv:1909.05261.

Papers Under Review

- N. Ramachandra, **G. Valogiannis** et al. "*Matter Power Spectrum Emulator for f(R) Modified Gravity Cosmologies*",
Submitted to Physical Review D, (2020), arXiv:2010.00596.
- A. Aviles, **G. Valogiannis** et al. "*Redshift space power spectrum beyond Einstein-de Sitter kernels*",
Submitted to Journal of Cosmology and Astroparticle Physics, (2020), arXiv:2012.05077.
- S. Alam et al. (including **G. Valogiannis**), "*Testing the theory of gravity with DESI: estimators, predictions and simulation requirements*",
Submitted to Journal of Cosmology and Astroparticle Physics, (2020), arXiv:2011.05771.
- R. Liu, **G. Valogiannis** et al., "*Constraints on $f(R)$ and nDGP Modified Gravity Model Parameters with Cluster Abundances and Galaxy Clustering*",
Submitted to Physical Review D, (2021), arXiv:2101.08728.

Collaboration Documents & White Papers

- M. Ishak et al. (including **G. Valogiannis**) "*Modified Gravity and Dark Energy models Beyond w(z)CDM Testable by LSST*",
Internal collaboration document of LSST DESC made publicly available, (2019), arXiv:1901.03763.

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

Conference Presentations

Talks

- (Invited) "*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

Invited Colloquia & Seminars

- "*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

Teaching & Mentoring Experience

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

Mentoring

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

Service & Volunteering

Reviewing Service

- Monthly Notices of the Royal Astronomical Society

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 partic-

ipation 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 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
& Senior Associate Dean for Undergraduate Education
Department of Astronomy
Cornell University
Ithaca, NY, 14853, USA
rbean@astro.cornell.edu

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

Prof. Nikolaos Stergioulas
Professor
Physics Department
Aristotle University of Thessaloniki
Thessaloniki, Greece
niksterg@auth.gr

Dr. Alejandro Aviles
Senior Research Associate
Physics Department
National Institute for Nuclear Research
Ciudad de Mexico, 11801, Mexico
aviles@ciencias.unam.mx