

# CURRICULUM VITAE

Charalambia Varnava

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## Studies

- 2020 – 2024: Ph.D. in Computing/Computer Science, Department of Computer Science and Engineering, European University Cyprus

Ph.D. Thesis: “A Bayesian method for fitting spectral energy distributions of galaxies with radiative transfer models”

Supervisor: Prof. Andreas Efstathiou

Research Group: Aristarchus Research Center

- 2013 – 2015: M.Sc. in Applied Mathematics (ranked 1<sup>st</sup>), Department of Mathematics and Statistics, University of Cyprus

Grade: Excellent (9.43/10) (Top graduate of my year)

M.Sc. Thesis: “Robust exponential convergence in a balanced norm for an  $hp$  finite element method applied to fourth order singularly perturbed problems” (Thesis’ Grade: Excellent)

Supervisor: Prof. Christos Xenophontos

- 2008 – 2012: B.Sc. in Mathematics, Department of Mathematics and Statistics, University of Cyprus

Grade: Very good

## Working & Educational Experience

- May 2020 – *present*: Researcher, Aristarchus Research Center, Department of Computer Science and Engineering, European University Cyprus
- Academic years 2022 – 2024: Scientific Collaborator, Department of Computer Science and Engineering, European University Cyprus

Instructor for:

MAT115 Statistics I

AEF105 Business Statistics

- January 2019 – March 2020: Post-Graduate Researcher, In-Silico Modelling Group, Department of Mechanical and Manufacturing Engineering, University of Cyprus

## Awards & Scholarships

- Scholarship for 100% of the tuition fees for the Ph.D. Program of Computing/Computer Science, granted by European University Cyprus (2020)
- Award of highest academic record during the Master's degree program in Applied Mathematics, granted by the Faculty of Pure and Applied Sciences of the University of Cyprus (2015)
- Sievert Larsson/Ancoria Excellence Award of highest academic record during the Master's degree program in Applied Mathematics, granted by the Department of Mathematics and Statistics of the University of Cyprus (2015)

## Development of tools

**SMART**: Spectral energy distributions **M**arkov chain **A**nalysis with **R**adiative **T**ransfer models

<https://github.com/ch-var/SMART>

An open-source tool that implements a Bayesian Markov chain Monte Carlo (MCMC) method to fit the ultraviolet to millimetre spectral energy distributions (SEDs) of galaxies exclusively with radiative transfer models

## Memberships

Founding member of Women in Mathematical Sciences in Cyprus (WMSC)

## Participation in Research Projects

- October 2022 – *present*: Further development of CYprus models for Galaxies and their NUClear Spectra (CYGNUS+), funded by European Space Agency (ESA)

- May 2020 – August 2021: CYprus models for Galaxies and their NUClear Spectra (CYGNUS), funded by ESA
- January 2019 – March 2020: In-silico tumoroid growth, University of Cyprus internal research program

## Fields of Scientific Interest

Computational mathematics

Mathematical and computational (in-silico) modelling

MCMC model fitting

Bayesian inference

Finite element method

## Journal Publications & Book Chapters

- Efstathiou, A., Lonsdale, C. J. and Varnava, C., 2024. Constraints on the starburst and active galactic nucleus activity of heavily obscured quasars at redshifts  $z \sim 0.3-3$ . *Monthly Notices of the Royal Astronomical Society*, in preparation
- Varnava, C. and Efstathiou, A., 2024. Constraints on the starburst and active galactic nucleus activity of local ultraluminous infrared galaxies from a broad range of torus models. *Monthly Notices of the Royal Astronomical Society*, in preparation
- Varnava, C. and Efstathiou, A., 2024. Exploring the properties of the obscured quasar COS-87259 at  $z=6.853$ . *Monthly Notices of the Royal Astronomical Society Letters*, in preparation
- Sykopetritou, I., Xenophontos, C. and Varnava, C., 2024. hp Finite Element Methods for singularly perturbed 4th order boundary value problems with two small parameters. *Mediterranean Journal of Mathematics*, under review
- Varnava, C. and Efstathiou, A., 2024. SMART: Spectral energy distributions Markov chain Analysis with Radiative Transfer models. *Monthly Notices of the Royal Astronomical Society*, 531(2), pp. 2304–2329

doi: [10.1093/mnras/stae1141](https://doi.org/10.1093/mnras/stae1141)

- Xenophontos, C., Constantinou, P. and Varnava, C., 2017. An hp Finite Element Method for Fourth Order Singularly Perturbed Problems. *Lecture Notes in Computational Science and Engineering*, 119, pp. 681-692  
doi: [10.1007/978-3-319-65870-4\\_49](https://doi.org/10.1007/978-3-319-65870-4_49)
- Constantinou, P., Varnava, C. and Xenophontos, C., 2016. An hp finite element method for 4<sup>th</sup> order singularly perturbed problems. *Numerical Algorithms*, 73(2), pp. 567-590  
doi: [10.1007/s11075-016-0108-9](https://doi.org/10.1007/s11075-016-0108-9)

### Invited Talks & Seminars

- Varnava, C., 2023. Portrait presentation. *1<sup>st</sup> WMSC Workshop: Portraits of Women in Mathematical Sciences in Cyprus, Nicosia, Cyprus*
- Uncovering obscured supermassive black holes at high redshift with a new MCMC SED fitting code. *Cyprus Astrophysics Workshop 2022: A close look at Luminous and Ultraluminous Infrared Galaxies, Nicosia/Paphos, Cyprus, 2022*

### Conference Presentations & Proceedings

- Panayidou, K., Efstathiou, A., Varnava, C. and Skrekas, P., 2024. Machine learning pipeline for speeding up SED fitting with radiative transfer models. *COSMO 21: Statistical Challenges in 21<sup>st</sup> Century Cosmology, Chania, Greece*
- Varnava, C. and Efstathiou, A., 2023. SMART: A new MCMC code for SED fitting with radiative transfer models in the JWST era. *European Astronomical Society Annual Meeting 2023, Krakow, Poland*
- Varnava, C., 2023. SMART: A new MCMC code for studying galaxy evolution. *4th Pancyprrian Conference in Statistics, Nicosia, Cyprus*
- Varnava, C., 2023. SMART: Spectral energy distributions Markov chain Analysis with Radiative Transfer models. *2<sup>nd</sup> Doctoral Colloquium of the Rectors' Conference of Cyprus Universities, Nicosia, Cyprus*
- Varnava, C., Efstathiou, A. and Lesta, V.P., 2022. Uncovering obscured supermassive black holes at high redshift with a new MCMC SED fitting code. *COSPAR 44th Scientific Assembly, Athens, Greece*. <https://www.youtube.com/watch?v=DEHolT-5a6Q&t=93s>

- Varnava, C., Efstathiou, A. and Lesta, V.P., 2022. Bayesian SED fitting with radiative transfer models for studying galaxy evolution. *European Astronomical Society Annual Meeting 2022, Valencia, Spain (Poster)*
  - Varnava, C., Efstathiou, A. and Lesta, V.P., 2022. Bayesian model fitting for studying galaxy evolution. *BNP 2022 Networking Workshop, Nicosia, Cyprus (Poster)*
  - Varnava, C., Efstathiou, A. and Lesta, V.P., 2021. MCMC model fitting methods for studying galaxy evolution. *Conference on Multiscale Physical and Biological Systems, Paphos, Cyprus (Poster)*
  - Efstathiou, A., Papadopoulou, V., Michos, I., Pavlou, O., Papaefthymiou, E., Varnava, C., Papadopoulos, M., 2020. How to discover supermassive black holes in galaxies. *European Researchers' Night 2020, Nicosia, Cyprus*
  - Tzirakis, K., Varnava, C., Hadjicharalambous, M., Wijeratne, P., Vavourakis, V., 2019. A Quantitative In Silico Framework to Simulate Cytotoxic and Nanoparticle Cancer Drug Delivery. *25<sup>th</sup> Congress of the European Society of Biomechanics, Vienna, Austria (Poster)*
- Xenophontos, C., Constantinou, P., Varnava, C., 2016. An hp Finite Element Method for Fourth Order Singularly Perturbed Problems. *ICOSAHOM 2016, Rio de Janeiro, Brazil*. doi: [10.1007/978-3-319-65870-4\\_49](https://doi.org/10.1007/978-3-319-65870-4_49)
- Xenophontos, C., Constantinou, P., Varnava, C., 2016. Robust exponential convergence of hp finite element method for 4 th order singularly perturbed problems. *13<sup>th</sup> Annual Workshop on Numerical Methods for Problems with Layer Phenomena, Moscow State University, Russia*
  - Xenophontos, C., Constantinou, P., Varnava, C., 2015. An hp finite element method for 4 th order singularly perturbed problems. *12<sup>th</sup> Annual Workshop on Numerical Methods for Problems with Layer Phenomena, TU Dresden, Germany*