

## Eleni Vardoulaki - CV

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Contact Information **Argelander-Institut für Astronomie**,  
University of Bonn, Auf dem Hügel 71, 53121, Bonn, Germany  
*email:* elenivard@gmail.com, eleniv@astro.uni-bonn.de  
*tel:* +4917663459424  
*websites:* astro.uni-bonn.de/~eleniv/, LinkedIn, radiogoals.physics.uoc.gr

Research Interests Multi-wavelength studies of extragalactic radio sources; active galactic nuclei (AGN); quasars; radio structures; (U)LIRGs; IR/radio relation; local and high-redshift Universe; galaxy evolution; cosmology; pattern recognition techniques; machine learning

Observational Astrophysics with focus on study of galaxy evolution, in the optical, infrared, radio and X-ray wavelengths, at low- and high-redshift Universe. Study of AGN, star-forming/starburst galaxies, their role in galaxy evolution, relation to host and environment and comparison of their energetics. Ultra-Luminous Infrared Galaxies (U-LIRGs). Study of infrared/radio relation in galaxies in the local Universe and at high redshifts. Study of the structure of galaxies with automatic methods, pattern recognition techniques and machine learning.

Education **University of Oxford**, Oxford, UK

DPhil., Astrophysics, 2003-2009

- Thesis Title: Understanding the nature of the faint radio-source population
- Advisor: Prof Steve Rawlings
- Thesis Examiners: Prof Katherine Blundell & Prof Philip Best

**University of Ioannina**, Ioannina, Greece

BSc, Physics, 1998-2002

- Distinction - **Rank: 2nd in class**
- Grade - 7.66/10
- Major: Astrophysics
- Thesis title: Seyfert galaxies, Active Galactic nuclei and comparison to Normal galaxies' (using IRAS data)
- Thesis advisor: Prof. Vassiliki Tsikoudi

Professional Experience **Argelander-Institut für Astronomie**, University of Bonn, Germany

*Postdoctoral Researcher:* Member of the international COSMOS collaboration. Study of AGN at radio wavelengths: physical properties, host, large-scale environment. Study of the infrared/radio relation in galaxies in the local and high-redshift Universe (in the COSMOS field) in relation to environment. Galaxy morphology in the optical (e.g. galfit) and radio wavelengths (e.g. pybdsim), as well as algorithms that automatically identify structures (pattern recognition) and use of machine learning techniques. Student supervision at undergraduate, masters and PhD levels.

**October 2015 to present**

**University of Crete**, Heraklion, Crete, Greece

*Postdoctoral Researcher: Radio continuum properties of (Ultra)-Luminous Infrared Galaxies*

**February 2012 to June 2015**

**California Institute of Technology (Caltech)**, Pasadena, CA, USA

*visiting Postdoctoral Researcher at the Infrared Processing and Analysis Center (IPAC)*

**May 2015**

**California Institute of Technology (Caltech)**, Pasadena, CA, USA

*visiting Postdoctoral Researcher at the Infrared Processing and Analysis Center (IPAC)*

**March–April 2013**

**Centro de Astrofísica da Universidade do Porto**, Porto, Portugal

*Research Fellow: Astrophysics of Active Galactic Nuclei*

**September 2010 to December 2011**

- Research on the stellar properties of the hosts of high-redshift active galactic nuclei

### **Observing experience**

- August 2006: WHT telescope, La Palma, Canary Islands, Spain (3 nights of observing - optical spectroscopy)
- September 2005: McDonald observatory, Texas, USA (10 nights of observing and self-operating the telescope - optical spectroscopy)
- February 2005: UKIRT telescope, Hawaii, USA (6 nights of observing - near-infrared imaging)

### **Computing and data reduction**

- Operating systems: Linux/Mac/Windows. Programming languages: Python, C, and Perl., Office applications and HTML.
- Experience in analysis of astronomical data using packages IRAF, AIPS, CASA and IDL.
- Galaxy morphology in the optical (e.g. galfit) and radio wavelengths (e.g. pybdsf).
- Data reduction and analysis in radio continuum surveys (VLA), in the optical (William Herschel Telescope, 2.7m McDonald Obs., HST) and in the infrared (UKIRT, Spitzer /IRAC/MIPS, Herschel)
- Use of machine learning algorithms for pattern recognition in astronomical imaging (e.g. SIANN, scikit-learn, tensorflow)

### **Student supervision**

- October 2017-December 2017: Student supervision in the frame of the Astroseminar at the University of Bonn. Student: Aswin Manohar. Paper for presentation: Nuclear obscuration in active galactic nuclei, Ramos Almeida, C. & Ricci, C. (2017)
- November 2016-January 2017: Student supervision in the frame of the Astroseminar at the University of Bonn. Student: Thanh Dat Hoang. Paper for presentation: The Radio Spectral Energy Distribution and Star Formation Rate Calibration in Galaxies, Tabatabaei et al. (2016)
- April 2016-May 2017: Co-supervision of masters thesis in astrophysics at the University of Bonn. Research topic: 1) Radio spectral index maps of radio AGN in the COSMOS field between 1.4 and 3 GHz, and 2) data reduction from archival GMRT observations in the COSMOS field at 330 MHz, Vishnu Balakrishnan, Bonn, 2017

- April 2015-October 2017: Co-supervision of masters thesis at the University of Bonn. Research topic: 1) Galaxy morphology in the COSMOS field; comparison of optical and radio structures, Nils Linz, Bonn, 2017
- October 2015-now: Co-supervision of PhD thesis in astrophysics at the University of Bonn. Research topic: 1) Size of star-forming galaxies in the radio in the COSMOS field, 2) study of a sub-mm galaxy at redshift above 4 with data in the optical, infrared, radio and ALMA, Eric Faustino Jimenez Andrade, Bonn, 2019
- October 2015-now: Co-supervision of PhD thesis in astrophysics at the University of Bonn. Research topic: 1) radio recombination lines in luminous infrared galaxies at low redshift, 2) developing of pipeline for optimising archival use of ALMA data (for the German ARC Node), 3) use of machine learning techniques for pattern recognition of complex radio structures, Toma Badescu, Bonn 2017
- October 2015-April 2016: Co-supervision of masters thesis in astrophysics at the University of Bonn with title "The Evolution of the FIR/Radio Correlation in the COSMOS Field", Christos Karoumpis, Bonn, 2016
- December 2015-April 2016: Co-supervision of undergraduate thesis in astrophysics at the University of Bonn with title 'Struktureigenschaften ferner Galaxien in der Karl G. Jansky VLA COSMOS Durchmusterung', Bianca Monika Hilger, Bonn, 2016

#### **Internal examiner**

February 2011: Principal investigator in master thesis defence, University of Porto

#### **Public outreach**

- pop science article writer at [scinews.eu](http://scinews.eu) since September 2017
- owner of [Rogue Astrophysics](https://www.youtube.com/channel/UCvY8v8v8v8v8v8v8v8v8v8v8) Youtube channel for science communication
- member of [SFB 956](https://www.sfb956.de) outreach team
- Interview on local TV channel regarding the solar eclipse of 2015
- Complete study on the correct placement of a sundial in the city of Heraklion, Crete
- Public talk for the 100 years of University of Porto (Winter 2011)
- Public outreach for Oxford University, University of Porto and for the E-ELT (Summer 2010)
- Author of article on Dark Matter, for a popular science portuguese newspaper
- Telescope demonstrating for [MacDonald Observatory](https://www.macdonaldobservatory.com) (September 2005)

#### **Publications in international journals**

1. The infrared-radio correlation of spheroid- and disc-dominated star-forming galaxies to  $z \sim 1.5$  in the COSMOS field, (Molnar, Daniel Cs.; Sargent, Mark T.; Delhaize, Jacinta; Delvecchio, Ivan; Smolcic, Vernesa; Novak, Mladen; Schinnerer, Eva; Zamorani, Giovanni; Bondi, Marco; Herrera-Ruiz, Noelia; Murphy, Eric J.; **Vardoulaki, Eleni**; Karim, Alexander; Leslie, Sarah; Magnelli, Benjamin; Carollo, C. Marcella; Middelberg, Enno), 2017, arXiv:1710.07655

2. The VLA-COSMOS 3 GHz Large Project: Cosmic evolution of radio AGN and implications for radio-mode feedback since  $z \sim 5$ , (Smolcic, V., Novak, M., Delvecchio, I., Ceraj, L., Bondi, M., Delhaize, J., Marchesi, S., Murphy, E., Schinnerer, E., **Vardoulaki, E.** and G. Zamorani ), 2017, A&A, 602, A6
3. The VLA-COSMOS 3 GHz Large Project: Multiwavelength counterparts and the composition of radio sources, (Smolcic, V., Zamorani, G., Delvecchio, I., Baran, N., Novak, M., Delhaize, J., Schinnerer, E., Berta, S., Bondi, M., Ciliegi, P., Capak, P., Civano, F., Karim, A., Le Fevre, O., Ilbert, O., Laigle, C., Marchesi, S., McCracken, H. J., Tasca, L., Salvato, M., and **Vardoulaki, E.**), 2017, A&A, 602, A2
4. The VLA-COSMOS 3 GHz Large Project: Continuum data and source catalog release, (Smolcic, V.; Novak, M.; Bondi, M.; Ciliegi, P.; Mooley, K. P.; Schinnerer, E.; Zamorani, G.; Navarette, F.; Bourke, S.; Karim, A.; **Vardoulaki, E.**, et al.), 2017, A&A, 602, A1
5. Radio continuum properties of luminous infrared galaxies. Identifying the presence of an AGN in the radio, (**Vardoulaki, E.**; Charmandaris, V.; Murphy, E. J.; Diaz-Santos, T.; Armus, L.; Evans, A.; Mazzarella, J. M.; Privon, G. C.; Stierwalt, S.; Barcos-Munoz, L.), 2015, A&A, 574, 4
6. Black-hole masses, accretion rates and hot- and cold-mode accretion in radio galaxies at  $z \sim 1$ , (Fernandes, C. A. C.; Jarvis, M. J.; Martinez-Sansigre, A.; Rawlings, S.; Afonso, J.; Hardcastle, M. J.; Lacy, M.; Stevens, J. A.; **Vardoulaki, E.**), 2015, MNRAS, 447, 1184
7. Evidence for a maximum jet efficiency for the most powerful radio galaxies, (Fernandes, C. A. C.; Jarvis, M. J.; Rawlings, S.; Martinez-Sansigre, A.; Hatziminaoglou, E.; Lacy, M.; Page, M. J.; Stevens, J. A.; **Vardoulaki, E.**), 2011, MNRAS, 411, 1909
8. The TexOx-1000 redshift survey of radio sources I: the TOOT00 region, (**Vardoulaki, Eleni**; Rawlings, Steve; Hill, Gary J.; Mauch, Tom; Inskip, Katherine J.; Riley, Julia; Brand, Kate; Croft, Steve; Willott, Chris J.), 2010, MNRAS, 401, 1709
9. Radio imaging of the Subaru/XMM-Newton Deep Field - II. The 37 brightest radio sources, (**Vardoulaki, Eleni**; Rawlings, Steve; Simpson, Chris; Bonfield, David G.; Ivison, R. J.; Ibar, Eduardo), 2008, MNRAS, 387, 505
10. Accretion indicators for the 37 brightest radio sources in the Subaru/XMM-Newton Deep Field, (**Vardoulaki, E.**; Rawlings, S.; Simpson, C.), 2007, NCimB, 122, 1029
11. The First Swift X-Ray Flash: The Faint Afterglow of XRF 050215B, (Levan, A. J.; Osborne, J. P.; Tanvir, N. R.; Page, K. L.; Rol, E.; Zhang, B.; Goad, M. R.; O'Brien, P. T.; Priddey, R. S.; Bersier, D.; Burrows, D. N.; Chapman, R.; Fruchter, A. S.; Giommi, P.; Gehrels, N.; Hughes, M. A.; Pak, S.; Simpson, C.; Tagliaferri, G.; **Vardoulaki, E.**), 2006, ApJ, 648, 1132
12. GRB 050215B: candidate afterglow, (Tanvir, N.; Pak, S.; Priddey, R.; Hughes, M.; Rol, E.; Levan, A.; O'Brien, P.; Simpson, C.; **Vardoulaki, E.**; Carroll, T.), 2005, GCN, 3031, 1

Publications in  
conferences  
proceedings with  
referees

1. The Radio Continuum Properties of Luminous Infrared Galaxies, (**Vardoulaki, E.**; Charmandaris, V.; Armus, L.; Murphy, E. J.; Diaz-Santos, T.; Evans, A.), The 11th Hellenic Astronomical Conference, held 8-12 September, 2013 in Athens, Greece. Online at <http://www.helas.gr/conf/2013/>, pp.29-29
2. Radio Continuum Properties of Luminous IR Galaxies, (Charmandaris, Vassilis; **Vardoulaki, E.**; Armus, L.; Murphy, E. J.; Diaz Santos, T.; Evans, A. S.; GOALS Team), American Astronomical Society, AAS Meeting 221, id.157.04
3. Stellar luminosities and radio structures of radio sources, (**Vardoulaki, E.**), 10th Hellenic Astronomical Conference, Proceedings of the conference held at Ioannina, Greece, 5-8 September 2011. Edited by Iossif Papadakis and Anastasios Anastasiadis., pp.20-20
4. Probing accretion activity in radio sources using 24 micron Spitzer data, (**Vardoulaki, Eleni**; Rawlings, Steve; Simpson, Chris), Conference proceedings of "Galaxy Evolution with Spitzer and Herschel", Crete, May 2006
5. The TOOT00 redshift survey of radio sources, (**Vardoulaki, E.**; Rawlings, S.; Hill, G. J.; Croft, S.; Brand, K.; Riley, J.; Willott, C.), 2006, AN, 327, 282

Working papers

1. The VLA-COSMOS 3GHz Large Project: multi-component radio sources, (**Vardoulaki, E.**; Jimenez Andrade, E. F.; Karim, A.; Smolčić, V.; Magnelli, B.; Bertoldi, F.; Schinnerer, E.; Sargent, M.; Bondi, M.; Zamorani, G.; Leslie, S.; Herrera Ruiz, N.; Middelberg, E.) , 2017, to be submitted
2. FR-type radio sources in COSMOS: relation to physical properties and environment, (**Vardoulaki, E.**; Jimenez Andrade, E. F.; Delvecchio, I.; Karim, A.; Smolčić, V.; Magnelli, B.; Bertoldi, F.; Schinnerer, E.; Sargent, M.; Gozaliasl, G.; Finoguenov, A.) , 2017, to be submitted), 2017, to be submitted
3. The COSMOS eye: a star-forming ring (**Vardoulaki, E.**; and the COSMOS team)
4. Dissecting the IR/radio relation in the local Universe: environmental scope, (**Vardoulaki, E.**; Karim, A.; Magnelli, B.; Sargent, M.; Smolcic, V.; Schinnerer, E. et al.)
5. Dissecting the IR/radio relation in the COSMOS field: environmental scope, (**Vardoulaki, E.**; Karim, A.; Magnelli, B.; Sargent, M.; Smolcic, V.; Schinnerer, E. et al.)
6. Peculiar FR-type radio sources in the COSMOS field: energetics and large-scale environment, (**Vardoulaki, E.**; Gozaliasl, G.; et al.)
7. Brightest X-ray group galaxies in COSMOS, (Gozaliasl, G.; **Vardoulaki, E.**; et al.)

8. Lyman continuum photon escape from FRI/FRII type radio AGN in the COSMOS field, (Vardoulaki, E.; Papaderos, P.; Gomes, J. M. et al.)
9. Spatial variations in the mid-IR/radio correlation in Luminous Infrared Galaxies, (Vardoulaki, E.; Charmandaris, V.; Murphy, E. J.; Diaz-Santos, T.; Armus, L., Appleton, P.; and the GOALS Team)
10. The stellar luminosities and radio structures of radio sources, (Vardoulaki, E.; Rawlings, S.; Mauch, T.; Hill, G. J.; Simpson, C.)

Student supervision & Teaching Experience	<p><b>Argelander-Institut für Astronomie</b>, Bonn, Germany</p> <p><i>Student supervision</i> <span style="float: right;"><b>October 2015-present</b></span></p> <ul style="list-style-type: none"> <li>• Undergraduate, Master's and PhD level</li> </ul> <p><b>Trinity College</b>, Oxford, UK</p> <p><i>Non-Stipendiary Lecturer in Astrophysics and Atmospheric Physics</i> <span style="float: right;"><b>2009</b></span></p> <ul style="list-style-type: none"> <li>• Tutoring 4th year students</li> </ul> <p><b>University College</b>, Oxford, UK</p> <p><i>Non-Stipendiary Lecturer in Astrophysics and Atmospheric Physics</i> <span style="float: right;"><b>2009</b></span></p> <ul style="list-style-type: none"> <li>• Tutoring 4th year students</li> </ul> <p><b>The Queen's College</b>, Oxford, UK</p> <p><i>Non-Stipendiary Lecturer in Astrophysics and Atmospheric Physics</i> <span style="float: right;"><b>2006</b></span></p> <ul style="list-style-type: none"> <li>• Tutoring of 4th year students</li> </ul>
Conference Presentations, Seminars and Schools International Conferences	<p>Diffuse Synchrotron Emission in Clusters of Galaxies - What's Next?, Contribution: talk <i>Leiden, Netherlands</i> <span style="float: right;"><b>October 2017</b></span></p> <p>COSMOS meeting, Contribution: talk <i>Kyoto, Japan</i> <span style="float: right;"><b>July 2017</b></span></p> <p>The 13th Hellenic Astronomical Conference, Contribution: talk/poster <i>Heraklion, Greece</i> <span style="float: right;"><b>July 2017</b></span></p> <p>COSMOS RMS meeting, Contribution: talk <i>Heidelberg, Germany</i> <span style="float: right;"><b>March 2017</b></span></p>

Escape of Lyman radiation from galactic labyrinths, Contribution: talk <i>Chania, Crete, Greece</i>	<b>April 2016</b>
JVLA COSMOS meeting, Contribution: talk <i>Zagreb, Croatia</i>	<b>February 2015</b>
The 12th Hellenic Astronomical Conference, Contribution: talk <i>Thessaloniki, Greece</i>	<b>June 2015</b>
EWASS 2015, Contribution: talk <i>Tenerife, Spain</i>	<b>June 2015</b>
Gas, Dust, and Star-Formation in Galaxies from the Local to Far Universe, Contribution: poster <i>Chania, Crete, Greece</i>	<b>May 2015</b>
Multiwavelength-Surveys: Galaxy Formation and Evolution from the early universe to today, Contribution: poster <i>Dubrovnik, Croatia</i>	<b>May 2014</b>
The 11th Hellenic Astronomical Conference, Contribution: poster <i>Athens, Greece</i>	<b>September 2013</b>
A panchromatic view of galaxy evolution 30 years after IRAS, Contribution: talk <i>Cyprus</i>	<b>June 2013</b>
The Modern Radio Universe 2013, Contribution: poster <i>Bonn, Germany</i>	<b>April 2013</b>
Infrared and Submillimeter Probes of Gas in Galaxies: From the Milky Way to the Distant Universe, Contribution: poster <i>Pasadena, USA</i>	<b>March 2013</b>
221st Meeting of the American Astronomical Society, Contribution: poster <i>Long Beach, USA</i>	<b>January 2013</b>
The 10th Hellenic Astronomical Conference, Contribution: poster <i>Ioannina, Greece</i>	<b>September 2011</b>
Challenges in Infrared Extragalactic Astrophysics II, Contribution: poster	

*Agios Nikolaos, Greece* **September 2010**

A century of Cosmology,  
Contribution: poster  
*Venice, Italy* **August 2007**

The discovery of the Anisotropy of the Fossil Radiation of the Universe, by George F. Smoot,  
Nobel Prize of Physics 2006  
*Paris, France* **December 2006**

AstroGrid Science Workshope and RadioNet/Astro Grid workshop for radio data providers,  
*Oxford, UK* **December 2006**

Studying Galaxy Evolution with Spitzer and Herschel,  
*Agios Nikolaos, Greece* **May 2006**

Cosmology, galaxy formation and astro-particle physics on the pathway to the SKA,  
*Oxford, UK* **April 2006**

High Redshift Radio Galaxies,  
Contribution: talk  
*Granada, Spain* **April 2005**

Conference on Lasers and their applications, FORTH  
*Heraklion, Greece* **June 2001**

Seminars given in  
English

Seminar at University of Crete  
*Heraklion, Greece* **July 2017**

Seminar at the National Observatory of Athens,  
*Athens, Greece* **June 2017**

Seminar at the Max Planck Institute for Radio Astronomy,  
*Bonn, Germany* **May 2017**

Seminar at the National Observatory of Athens,  
*Athens, Greece* **December 2016**

Seminar at the Max Planck Institute for Radio Astronomy,  
*Bonn, Germany* **December 2016**

Seminar at the Max Planck Institute for Radio Astronomy,  
*Bonn, Germany* **April 2016**

Seminar at University of Crete  
*Heraklion, Greece* **March 2012**



Seminar at the National Observatory of Athens, <i>Athens, Greece</i>	<b>April 2011</b>
Seminar at CAUP <i>Porto, Portugal</i>	<b>April 2011</b>
Public outreach talk for the 150 years of University of Porto, <i>Porto, Portugal</i>	<b>March 2011</b>
Seminar at Princeton University, <i>New Jersey, USA</i>	<b>September 2010</b>
Seminar at University of Oxford, <i>Oxford, UK</i>	<b>March 2010</b>
Seminar at University of Cardiff, <i>Cardiff, UK</i>	<b>December 2007</b>
Seminar at University of Oxford, <i>Oxford, UK</i>	<b>April 2005</b>
Seminar at University of Oxford, <i>Oxford, UK</i>	<b>May 2004</b>
Participations in seminars and schools	
Machine Learning course by Stanford University on Coursera, <i>Certification:</i>	<b>January 2017</b>
Seminar with title 'Managing RD Projects', Dr. Cristine Issa, University of Cologne, <i>Cologne, Germany</i>	<b>October 2016</b>
Seminar with title 'Time- and Self-Mangement', Dr. Carrie B. Dohe, University of Cologne <i>Cologne, Germany</i>	<b>October 2016</b>
Seminar with title 'Professional Presentations at Conferences and in the Academic World', Dr Carrie B. Dohe, University of Cologne <i>Cologne, Germany</i>	<b>June 2016</b>
Seminar with title 'Self-Marketing for Female Scientists', Dr Cristine Issa, University of Cologne <i>Cologne, Germany</i>	<b>April 2016</b>
Ninth Synthesis Imaging Summer School, <i>New Mexico, USA</i>	<b>June 2004</b>
Summer School on Physics, University of Crete <i>Heraklion, Greece</i>	<b>June 2002</b>

## Awards

### **General Secretariat for Research and Technology, Greece**

Post-Doctoral Research position supported by the Action "Supporting Postdoctoral Researchers" of the Operational Program "Education and Lifelong Learning" (Action's Beneficiary: General Secretariat for Research and Technology), and co-financed by the European Social Fund (ESF) and the Greek State, 2012-2015

### **Centro de Astrofisica da Universidade do Porto (CAUP), Portugal**

Post-Doctoral Fellowship awarded by CAUP, 2010

### **St. Peter's College, Oxford, UK**

Three travel grants awarded by St. Peter's College during DPhil studies

### **State Scholarships Foundation IKY, Greece**

Award by the Greek scholarship foundation IKY for achieving 1st rank during the 3rd year of undergraduate studies, 2001

Award by the Greek scholarship foundation IKY for achieving 1st rank during the 1st year of undergraduate studies, 1999

## Languages

- Greek: Native speaker
- English: Fluent & Proficiency from Cambridge University
- Portuguese: Basic
- French: Basic
- German: Basic

## Affiliations

*Member* of the international collaboration COSMOS since 2015

*Member* of the Hellenic Astronomical Society since 2010

## References

Prof Frank Bertoldi  
Argelander-Institut für Astronomie, Bonn  
bertoldi@astro.uni-bonn.de

Prof Vassilis Charmandaris  
University of Crete  
charmandaris@noa.gr

Dr Polychronis Papaderos  
Centro de Astrofisica da Universidade do Porto  
papaderos@astro.up.pt

Prof Vernesa Smolčić  
University of Zagreb  
vs@phy.hr