

# Veronica Guidetti

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## Work Experience

**01/2023 - now Postdoctoral position**

*University of Modena and Reggio Emilia*

Group leader: Federica Mandreoli

Topic: Machine Learning, Data Mining, AI applications for healthcare

**11/2020 - 11/2022 Postdoctoral position**

*DESY- Deutsches Elektronen-Synchrotron, Hamburg*

Group leader: Alexander Westphal, Geraldine Servant

Topic: Cosmology, Machine learning, String Phenomenology

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## Education

**11/2017 - 03/2021 PhD Course in Theoretical Physics cum Laude**

*Alma Mater Studiorum, University of Bologna*

Supervisor: Prof. Michele Cicoli

Thesis: Axion-like particles and inflation from string theory

**01-04/2019 Visiting PhD student**

*DESY- Deutsches Elektronen-Synchrotron, Hamburg*

Local tutors: Valerie Domcke, Alexander Westphal

**01-06/2017 Research Scholarship**

*Alma Mater Studiorum, University of Bologna - INFN Bologna*

Department of Physics and Astronomy

Supervisor: Prof. Michele Cicoli

Project title: Study of Dark Matter Models in String Compactification

Bando: [https://bandi.unibo.it/agevolazioni/borse-laureati?id\\_bando=451](https://bandi.unibo.it/agevolazioni/borse-laureati?id_bando=451)

**03/2017 Post Graduate Diploma in Mathematical Finance, 30/30 cum Laude**

*Alma Mater Studiorum, University of Bologna*

Department of Mathematics

Course Directors: Prof. Andrea Pascucci, Prof. Sergio Polidoro

Website: <http://www.dm.unibo.it/finanza/>

**04/2016 Master Course in Theoretical Physics, 110/110 cum Laude**

*Alma Mater Studiorum, University of Bologna*

Thesis: "Axion-like particles and the 3.5 keV line in 4D string models"

Supervisor: Prof. Michele Cicoli

**07/2013 Bachelor Course in Physics, 110/110 cum Laude**

*University of Modena and Reggio Emilia*

Thesis: "Simulazione Monte Carlo del trasporto elettronico in materiali amorfi"

Supervisor: Prof. Carlo Jacoboni

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**Publications:**

Web pages [Google Scholar profile](#)

[Scopus profile](#)

**??/2023 Similarity and Generalization: From Noise to Corruption (*under review at ICLR*)**

*Nayara Fonseca, Veronica Guidetti*

**Funded by: CoSubmitting Summer @ ICLR 2022**

[arXiv:2201.12803](#) .

**12/2022 Multi-Objective Symbolic Regression for Data-Driven Scoring System Management**

*Davide Ferrari, Veronica Guidetti and Federica Mandreoli*

Proceedings of IEEE International Conference on Data Mining (ICDM) 2022

[\(link to the conference program\)](#) .

**12/2022 On the choice of entropy variables in multifield inflation (*under review at Classical and Quantum Gravity*)**

*Michele Cicoli, Veronica Guidetti, Francesco Muia, Francisco Gil Pedro, Gian*

*Paolo Vacca*

[arXiv:2107.03391](#) .

**11/2022 Multi-objective Symbolic Regression to Generate Data-driven, Non-fixed Structure and Intelligible Mortality Predictors using EHR: Binary Classification Methodology and Comparison with State-of-the-art**

*Davide Ferrari, Veronica Guidetti, Yanzhong Wang, Vasa Curcin*

Proceedings of American Medical Informatics Association (AMIA) 2022 Annual Symposium, ([link](#)) .

**10/2022 Real-world data mining meets clinical practice: research challenges and perspective**

*Federica Mandreoli, Davide Ferrari, Veronica Guidetti, Federico Motta and Paolo Missier*

Frontiers in big Data, 2022, 99", ([link](#)) .

**09/2022 A Fake Instability in String Inflation**

*Michele Cicoli, Veronica Guidetti, Francesco Muia, Francisco Gil Pedro, Gian Paolo Vacca*

Classical and Quantum Gravity, Vol. 39, N. 19, [arXiv:2107.12392](#) .

**06/2022 Axionic Festina Lente (*JHEP, in publication*)**

*Veronica Guidetti, Nicole Righi, Gerben Venken, Alexander Westphal*  
[arXiv:2206.03494](#) .

**05/2022 Fuzzy dark matter candidates from String Theory**

*Michele Cicoli, Veronica Guidetti, Nicole Righi, Alexander Westphal*

JHEP 2205 (2022) 107, [arXiv:2110.02964](#) .

**02/2021 dNNsolve: an efficient NN-based PDE solver**

*Veronica Guidetti, Francesco Muia, Yvette Welling, Alexander Westphal*

[arXiv:2103.08662](#) .

**02/2020 Resonant backreaction in axion inflation**

*Valerie Domcke, Veronica Guidetti, Yvette Welling, Alexander Westphal*

JCAP 2009 (2020) no.09, 009, [arXiv:2002.02952](#) .

**03/2019 Geometrical Destabilisation of Ultra-Light Axions in String Inflation**

*Michele Cicoli, Veronica Guidetti, Francisco G. Pedro,*  
JCAP 1905 (2019) no.05, 046, [arXiv:1903.01497](#) .

**07/2018 A geometrical instability for ultra-light fields during inflation?**

*Michele Cicoli, Veronica Guidetti, Francisco G. Pedro, Gian Paolo Vacca,*  
JCAP 1812 (2018) no.12, 037, [arXiv:1807.03818](#) .

**11/2017 Chiral Global Embedding of Fibre Inflation Models**

*Michele Cicoli, David Ciupke, Victor A. Diaz, Veronica Guidetti, Francesco Muia, Pramod Shukla,*  
JHEP 1711 (2017) 207, [arXiv:1709.01518](#) .

**10/2017 The 3.5 keV Line from Stringy Axions**

*Michele Cicoli, Victor A. Diaz, Veronica Guidetti, Markus Rummel,*  
JHEP 1710 (2017) 192, [arXiv:1707.02987](#) .

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**Research interests:**

- Interpretable AI
- Healthcare applications in AI
- Automated ML
- Unify information bottleneck, feature learning, and double descent phenomena
- Improving Physics-Informed NN method efficiency and generalization
- Effective Deep Learning theory

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**Participation at conferences, courses and seminars**

**11/2022 IEEE International Conference on Data Mining (ICDM) 2022**

*Orlando, Florida*

November 28 - December 01.

Site: <https://icdm22.cse.usf.edu>

**Talk:** Multi-Objective Symbolic Regression for Data-Driven Scoring System Management

**09/2022 Coursera online courses**

Probabilistic Deep Learning with TensorFlow 2 ([Website](#))

**09/2022 Machine learning at GGI workshop**

*GGI - Florence*

September 12 - September 23.

Site: <https://agenda.infn.it/event/32043/>

**Talk:** Generalization in Similarity Learning

**09/2022 Towards the Next Fundamental Scale of Nature: New Approaches in Particle Physics and Cosmology**

*Mainz Institute for Theoretical Physics, Johannes Gutenberg University*

July 11 - July 15.

Site: <https://indico.mitp.uni-mainz.de/event/261/>

**04/2022 Intelligent Health UK 2022**

*ExCeL, London*

April 6 - April 7.

Site: <https://iii.hm/healthaiuk2022>

**09/2021 Desy Theory workshop**

*DESY - Hamburg*

September 21 - September 24.

Site: <https://th-workshop2021.desy.de>

**Talk:** Double descent in contrastive learning

**11-12/2020 Coursera online courses**

**Deep Learning Specialization (Website)**

**TensorFlow: Advanced Techniques Specialization (Website)**

**07/2020 Fuzzy Dark Matter Workshop**

*Web conference*

July 20 - July 23.

Site: <https://indico.desy.de/indico/event/25188/>

**Talk:** Fuzzy dark matter from strings?

**06/2020 StringPheno 2020**

*Web conference*

June 08 - June 12.

Site: [https://web.northeastern.edu/het/string\\_pheno/](https://web.northeastern.edu/het/string_pheno/)

**12/2019 XV Avogadro meeting on Strings, Supergravity and gauge theories**

*Naples University,*

December 18 - December 20, Naples, Italy.

Site: <https://agenda.infn.it/event/19816/>

**Talk:** Fuzzy dark matter from strings: how viable?

**10/2019 TFI 2019: Theories of Fundamental Interactions 2019**

*Turin University,*

October 22 - October 23, Turin, Italy.

Site: <https://agenda.infn.it/event/20096/>

**10/2019 Challenges and Opportunities of High Frequency Gravitational Wave Detection**

*ICTP,*

October 14 - October 16, Trieste, Italy.

Site: <http://indico.ictp.it/event/9006/>

**06/2019 StringPheno19 - String Phenomenology 2019**

*CERN,*

June 24 - June 28, Geneva, Switzerland.

Site: <https://indico.cern.ch/event/782251/>

**Talk:** Geometrical destabilisation in string inflation

**06/2019 Inflation and Geometry**

*IAP Paris,*

June 11 - June 13, Paris, France.

Site: <http://sites.google.com/view/inflation-geometry-2019/home>

**Talk:** Geometrical destabilisation of light fields in string inflation

**06/2019 Planck 2019**

*Parque de las Ciencias,*

June 03 - June 07, Granada, Spain.

Site: <http://cafpe.ugr.es/planck2019/>

**04/2019 Leiden Spring 2019**

*Institute Lorentz,*

April 05, Leiden, Holland.

Site: [http://cosmology.nl/?tribe\\_events=leiden-spring-2019](http://cosmology.nl/?tribe_events=leiden-spring-2019)

**Talk:** Geometrical destabilisation of light fields in string inflation

**07/2018 StringPheno18 - String Phenomenology 2018**

*Faculty of Physics, University of Warsaw,*

July 02 - July 06, GGI, Warsaw, Poland.

Site: <http://sp18.fuw.edu.pl/>

**Talk:** Chiral Global Embedding of Fibre Inflation Models - [file link](#)

**01/2018 GGI Lectures on the Theory of Fundamental Interactions 2017**

*GGI - Galileo Galilei Institute for Theoretical Physics, INFN*

January 09 - January 27, GGI, Arcetri , Italy.

**12/2017 LACES 2017 - Lezioni Avanzate di Campi e Stringhe**

*GGI - Galileo Galilei Institute for Theoretical Physics, INFN*

November 27 - December 15, GGI, Arcetri , Italy.

**09/2017 Post-Inflationary String Cosmology**

*INFN, Alma Mater Studiorum and University of Liverpool*

September 18-21, Bologna , Italy.

**09/2017 TFI 2017 - Theories of the Fundamental Interactions**

*INFN Networks GAST, GSS and ST&FI*

September 11-13, Parma , Italy.

**06/2017 String Theory & Cosmology**

*Gordon Research Conference*

May 28 - June 02, Barga, Lucca, Italy.

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**Skills**

**Computer Skills** Python, Wolfram Mathematica, Tensorflow, Matlab, C++, Fortran

**Foreign Language Skills** **English:** Fluent (C1)

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## Teaching Experience

### a.y. 2021/2022 Bachelor thesis co-supervisor

*University of Modena and Reggio Emilia*

Student: Angelo Terzi

Thesis: Regolarizzazione di multi-objective symbolic regression per la definizione di indici.

### 10/2022 - 10/2022 Teacher's assistant/Lecture's co-author

*Bologna Business School*

Course: Real-world data mining

[Link to the Python tutorial](#) .

### 10/2018 - 09/2019 General Physics Tutor

*Alma Mater Studiorum, University of Bologna*

Course: General Physics (Module 1)

Bachelor in Mathematics

### a.y. 2017/2018 Master thesis co-supervisor

*Alma Mater Studiorum, University of Bologna*

Student: Nicole Righi

Thesis: [Fuzzy Dark Matter from String Axions](#)

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## Professional Membership

### 2016-2021 Affiliation to I.N.F.N. (Istituto Nazionale di Fisica Nucleare)

"In compliance with the Italian legislative Decree no. 196 dated 30/06/2003, I hereby authorize you to use and process my personal details contained in this document"

Modena, 17/01/2023