



## Mirko Degli Esposti

Date of birth: 18/12/1965 | **Nationality:** Italian | **Gender:** Male |

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<https://www.unibo.it/sitoweb/mirko.degliesposti/en> |

Via Giorgio Ercolani 8, 40122, Bologna, Italy

### WORK EXPERIENCE

2015 - 31/10/2021 - Bologna, Italy  
**DEPUTY RECTOR - UNIVERSITY OF BOLOGNA**

Bologna, Italy

2020 - 31/10/2021 - Bologna, Italy  
**VICE-RECTOR FOR DIGITAL TECHNOLOGIES - UNIVERSITY OF BOLOGNA**

Bologna, Italy

01/01/2020 - CURRENT - Bologna, Italy  
**MEMBER OF THE PHYSICS DEPARTMENT - UNIVERSITY OF BOLOGNA**

2020 - CURRENT - Bologna, Italy  
**FOUNDER AND MEMBER OF THE INTERDEPARTMENTAL RESEARCH CENTRE "ALMA MATER RESEARCH INSTITUTE FOR HUMAN-CENTERED ARTIFICIAL INTELLIGENCE (ALMA HUMAN AI)" - UNIVERSITY OF BOLOGNA**

Bologna

2020 - CURRENT - Roma, Italy  
**MEMBER OF THE CRUI GRUPPO "CARE" (ELECTRONIC RESOURCES ACCESS COORDINATION GROUP) - CRUI (CONFERENCE OF THE RECTORS OF ITALIAN UNIVERSITIES)**

Roma

2019 - CURRENT - Bologna, Italy  
**MEMBER OF THE ACADEMY OF SCIENCES OF BOLOGNA - UNIVERSITY OF BOLOGNA**

Bologna, Italy

2018 - CURRENT - Bologna, Italy  
**MEMBER OF THE COUNCIL OF ADMINISTRATION OF THE "FONDAZIONE INNOVAZIONE URBANA" (FIU, [HTTPS://WWW.FONDAZIONEINNOVAZIONEURBANA.IT](https://www.fondazioneinnovazioneurbana.it)) - FONDAZIONE INNOVAZIONE URBANA**

Bologna, Italy

2018 – CURRENT

**MEMBER OF THE EXPERT GROUP ON SCIENCE 2.0/OPEN SCIENCE – EUROPEAN UNIVERSITY ASSOCIATION (EUA)**

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Bruxelles, Belgium

2016 – CURRENT – Bologna, Italy

**DEAN OF THE ALMA MATER FOUNDATION – FONDAZIONE ALMA MATER**

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Bologna, Italy

2016 – CURRENT

**NATIONAL COORDINATOR OF THE CRUI WORKING GROUP ON UNIVERSITY RANKINGS – CRUI (ITALIAN NATIONAL CONFERENCE OF RECTORS)**

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Roma, Italy

2016 – CURRENT

**NATIONAL COORDINATOR OF THE UI GREENMETRIC WORLD UNIVERSITY RANKINGS – UNIVERSTAS INDONESIA**

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Indonesia

2016 – CURRENT

**MEMBER OF THE IREG EXECUTIVE BOARD , OBSERVATORY ON ACADEMIC RANKING AND EXCELLENCE – IREG OBSERVATORY**

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Warsaw, Poland

2016 – CURRENT

**MEMBER OF THE QS INTELLIGENCE UNIT ADVISORY BOARD – QS WORLD UNIVERSITY RANKINGS**

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London, United Kingdom

2016 – CURRENT – Bologna, Italy

**DEAN OF THE BOLOGNA UNIVERSITY LIBRARY (BUB) – UNIVERSITY OF BOLOGNA**

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Bologna, Italy

2015 – CURRENT – Bologna, Italy

**DEAN OF THE UNIVERSITY CENTER FOR THE PROTECTION AND PROMOTION OF HEALTH AND SAFETY – UNIVERSITY OF BOLOGNA**

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Bologna, Italy

2013 – CURRENT – Bologna, Italy

**MEMBER OF THE ADVANCED RESEARCH CENTER ON ELECTRONIC SYSTEMS "ERCOLE DE CASTRO" – UNIVERSITY OF BOLOGNA**

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Bologna, Italy

2008 – CURRENT – Bologna, Italy

**MEMBER OF THE INTERDEPARTMENTAL CENTRE "L. GALVANI" FOR INTEGRATED STUDIES OF BIONIFORMATICS, BIOPHYSICS AND BIOCOMPLEXITY – UNIVERSITY OF BOLOGNA**

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Bologna, Italy

2007 – CURRENT – Bologna, Italy

**FULL PROFESSOR IN MATHEMATICAL PHYSICS – UNIVERSITY OF BOLOGNA**

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Bologna, Italy

2016 – 2019 – Bologna, Italy

**DEAN OF THE AGRICULTURAL COMPANY OF THE UNIVERSITY OF BOLOGNA – UNIVERSITY OF BOLOGNA**

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Bologna, Italy

2013 – 2015 – Roma, Italy

**NATIONAL SECRETARY OF CONSCIENZE, NATIONAL CONFERENCE OF PRESIDENTS AND DIRECTORS OF UNIVERSITY STRUCTURES IN SCIENCE AND TECHNOLOGY – CONSCIENZE**

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2012 – 2015 – Bologna, Italy

**REPRESENTATIVE OF THE ACADEMIC SENATE IN THE SCIENTIFIC COMMITTEE OF THE UNIVERSITY LIBRARY SYSTEM – UNIVERSITY OF BOLOGNA**

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Bologna, Italy

2012 – 2015 – Bologna, Italy

**MEMBER OF THE ACADEMIC SENATE – UNIVERSITY OF BOLOGNA**

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Bologna, Italy

2008 – 2015 – Bologna, Italy

**HEAD OF THE DEPARTMENT OF MATHEMATICS – UNIVERSITY OF BOLOGNA**

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Bologna, Italy

2005 – 2008 – Bologna, Italy

**MEMBER OF THE TEACHING COMMISSION, FACULTY OF SCIENCE – UNIVERSITY OF BOLOGNA**

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Bologna, Italy

2005 – 2008 – Bologna, Italy

**MEMBER OF THE COUNCIL OF THE DEPARTMENT OF MATHEMATICS – UNIVERSITY OF BOLOGNA**

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Bologna, Italy

2002 – 2007 – Bologna, Italy

**ASSOCIATE PROFESSOR IN MATHEMATICAL PHYSICS – DEPARTMENT OF MATHEMATICS, UNIVERSITY OF BOLOGNA**

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Bologna, Italy

1992 – 2002 – Bologna, Italy

**UNIVERSITY RESEARCH ASSISTANT – UNIVERSITY OF BOLOGNA**

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Bologna, Italy

1998 – 2000 – Atlanta, Georgia, United States

**VISITING PROFESSOR – SCHOOL OF MATHEMATICS, GEORGIA INSTITUTE OF TECHNOLOGY**

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Atlanta, GA, United States

1995 – Paris, France

**PROFESSEUR INVITÉ – LABORATOIRE DE PHYSIQUE THÉORIQUE ET MATHÉMATIQUE UNIVERSITÉ PARIS VII**

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Paris, France

## ● **EDUCATION AND TRAINING**

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1994 – State College, PA, United States

**PH.D. IN MATHEMATICS – Pennsylvania State University**

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EQF level 8

09/1989 – 08/1990 – Pasadena, California, United States

**GRADUATE SCHOOL – Department of Mathematics, Caltech**

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05/1989 – 09/1989 – Berlin, Germany

**SCHOLARSHIP OF THE “AKADEMIE DER WISSENSCHAFTEN ZU BERLIN”, – Department of Mathematics, Technische Universität**

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1988 – Bologna, Italy

**DEGREE IN PHYSICS (CUM LAUDE) – University of Bologna**

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### **Field(s) of study**

- Physical sciences

EQF level 7

**LANGUAGE SKILLS**

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Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
<b>ENGLISH</b>	B2	B2	B2	B2	B1
<b>SPANISH</b>	A2	A2	A2	A2	A1
<b>FRENCH</b>	A1	A1	A1	A1	

*Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user***DIGITAL SKILLS**

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Google Drive | Social Media | Skype | Zoom | Facebook | Linguaggio Phyton | Good knowledge of Wolfram Mathematica | Latex: advanced user | Microsoft office (Outlook, Word, Excel, PowerPoint, Publisher, Access, Teams)

## PUBLICATIONS

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### Publications

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full list: <https://www.unibo.it/sitoweb/mirko.degliesti/publications>

#### Selected Papers:

- Lippi, Marco; Montemurro, Marcelo A; Degli Esposti, Mirko; Cristadoro, Giampaolo, *Natural Language Statistical Features of LSTM-Generated Texts*, «IEEE TRANSACTIONS ON NEURAL NETWORKS AND LEARNING SYSTEMS», 2019, 30, pp. 3326 - 3337
- Cristadoro, Giampaolo; Degli Esposti, Mirko; Altmann, Eduardo G., *The common origin of symmetry and structure in genetic sequences*, «SCIENTIFIC REPORTS», 2018, 8, pp. 15817 - 15825
- E. G. Altmann; G. Cristadoro; M. Degli Esposti, *On the origin of long-range correlations in texts*, «PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA», 2012, 109, pp. 11582 - 11587
- Paci, G; Cristadoro, G; Monti, B; Lenci, M; Degli Esposti, M; Castellani, Gc; Remondini, D, *Characterization of DNA methylation as a function of biological complexity via dinucleotide inter-distances*, «PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY OF LONDON SERIES A: MATHEMATICAL PHYSICAL AND ENGINEERING SCIENCES», 2016, 374, pp. 1 - 11
- Benedetto, Dario; Degli Esposti, Mirko, *Dynamics of Style and the Case of the Diario Postumo by Eugenio Montale: A Quantitative Approach*, in: Mirko Degli Esposti, Eduardo G. Altmann, François Pachet, *Creativity and Universality in Language*, Berlin, Springer, 2016, pp. 157 - 176
- Seri, Marcello; Knauf, Andreas; DEGLI ESPOSTI, Mirko; Jecko, Thierry, *Resonances in the two-center Coulomb systems*, «REVIEWS IN MATHEMATICAL PHYSICS», 2016, 28, pp. 1 - 55
- Roberto Artuso; Giampaolo Cristadoro; Mirko Degli Esposti; Georgie Knight, *Sparre-Andersen theorem with spatiotemporal correlations*, «PHYSICAL REVIEW E, STATISTICAL, NONLINEAR, AND SOFT MATTER PHYSICS», 2014, 89, pp. 052111-1 - 052111-4
- Riccardo Gallotti; Armando Bazzani; Mirko Degli Esposti; Sandro Rambaldi, *Entropic measures of individual mobility patterns*, «JOURNAL OF STATISTICAL MECHANICS: THEORY AND EXPERIMENT», 2013, 2013, pp. P10022 - P10041
- G Cristadoro; G Knight; M Degli Esposti, *Follow the fugitive: an application of the method of images to open systems*, «JOURNAL OF PHYSICS. A, MATHEMATICAL AND THEORETICAL», 2013
- D. Benedetto; E. Caglioti; G. Cristadoro; M. Degli Esposti, *Relative entropy via non-sequential recursive pair substitution*, «JOURNAL OF STATISTICAL MECHANICS: THEORY AND EXPERIMENT», 2010, 2010, pp. 1 - 14
- C. Basile; D. Benedetto; E. Caglioti; G. Cristadoro; M. Degli Esposti, *A plagiarism detection procedure in three steps: selection, matches and "squares"*, in: Proceedings of the SEPLN'09 Workshop on Uncovering Plagiarism, Authorship and Social Software Misuse, SINE LOCO, 2009, pp. 19 - 24
- L. Bunimovich; M. Degli Esposti; M. Horvat; S. Isola; T. Prosen, *On ergodic and mixing properties of the triangle map*, «PHYSICA D-NONLINEAR PHENOMENA», 2009, 238, pp. 395 - 415
- C. Basile; D. Benedetto; E. Caglioti; M. Degli Esposti, *An example of mathematical authorship attribution*, «JOURNAL OF MATHEMATICAL PHYSICS», 2008, 49, pp. 1 - 20

### Publications

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#### Editor:

- *"Computational Synthesis and Creative Systems"*, with F. Pachet, P. Gervás and A. Passerini
- *"Creativity and Universality in Language"*, with F. Pachet and E. Altmann, *Lecture Notes in Morphogenesis*, Springer (2015)
- *"The Mathematical Aspects of Quantum Chaos"*, with S. Graffi, *Lecture Notes in Physics*, Springer (2003)
- *"La Matematica nella Società e nella Cultura"*, U.M.I. (Union of the Italian Mathematics)

I am also co-author of the **University textbooks**:

- *Matematica per scienze della vita*, Dario Benedetto, Mirko Degli Esposti, Carlotta Maffei, Casa Editrice Ambrosiana. Zanichelli exclusive distribution (third edition)
- *Dalle funzioni ai modelli*, il calcolo per le bioscienze, Dario Benedetto, Mirko Degli Esposti, Carlotta Maffei, Casa Editrice Ambrosiana. Zanichelli exclusive distribution

## ● PROJECTS

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### Projects

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Right now I'm participating in two European projects:

- **Harmony** (*Healthcare Alliance for Resourceful Medicines Offensive against Neoplasms in Hematology*)  
<https://www.unibo.it/en/research/projects-and-initiatives/research-projects-horizon-2020-1/harmony>
- **VEO** (*Versatile Emerging infectious disease Observatory*)  
<https://cordis.europa.eu/project/id/874735/it>

**Remark:** In recent years I have not coordinated any European project, but I have instead spent most of my energy on ensuring that many researchers could have the environment and the ideal conditions to win their own European research projects, and I would say with good results.

## ● ORGANISATIONAL SKILLS

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### Organisational skills

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While keeping my research active, I've gained quite a lot of experience in the **University System**: my seven-year experience as **Director of a large Department** (2008-2015) and my current experience as **Deputy Rector** (from 2015) of a so-called public mega university such as the one of Bologna, have naturally and consciously allowed me to acquire skills and experience in the fields of **research policy, research valorisation** and in the **administration and management of higher education institutions**.

## ● COMMUNICATION AND INTERPERSONAL SKILLS

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### Communication and interpersonal skills

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In recent years, as **Deputy Rector**, I have developed a great capacity for **dialogue, listening** and **conflicts resolution**.

## ● MY RESEARCH AT A GLANCE

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### My Research at a Glance

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As a *mathematical physicist*, I began my research career by addressing fundamental questions of **quantum mechanics**, in particular **quantum chaos**, and the **theory of dynamical systems**, with incursions into **statistical mechanics**.

In the last years I have turned my attention to the use of mathematics in life sciences and humanities, naturally migrating towards a **data-driven mathematics** in close contact with other disciplines.

Essentially there are two areas touched by my current scientific production, **natural language** and **genetic sequences**:

1) *natural language*:

the problems I deal with are the mathematical models of evolution of natural language, the automatic algorithms of author recognition, the origins of long correlations in written language, the artificial generation of natural language through machine learning and artificial intelligence techniques, and lately the study of translation processes from the point of view of dynamical systems. The theory of dynamical systems, information theory and machine learning techniques represent the basis of my skills and approaches to problems.

2) *gene sequences*:

here my research is essentially focused on the exploration of the relationships between symmetries and long correlations in gene sequences and in particular on the understanding of the origin of the so-called "*second Chargaff rule*", with an approach both theoretical and data-driven, addressed with the tools of the theory of dynamic systems and information theory.

I recently participated in the design, creation and start-up of the interdepartmental research center "*Alma Mater Research Institute for Human-Centered Artificial Intelligence*" (*Alma Human AI*)

## ● CITATIONS

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### Citations

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Google Scholar: [Mirko Degli Esposti](#)

### Citations

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**Media:**

- [Appello per Patrick George Zaki](#) - **Che tempo che fa** 16/02/2020
- **Focus Storia**, settembre 2015, "[Codice Segreto](#)"
- **Unibo Magazine**, novembre 2014, "[Il Diario Postumo di Montale è un Falso ?](#)"
- **Corriere di Bologna**, novembre 2014, "[I ricercatori dell'Alma Mater: «Il Diario postumo di Montale è falso»](#)"
- **Le scienze**, novembre 2012, "[Romanzo Matematico](#)"
- **Ansa.it**, luglio 2012, "[I Romanzi nel mirino della Matematica](#)"
- **Radio 3 Scienza**, settembre 2006, "[Sgominata l'Anonima Scrittori](#)"



## ● **TEACHING**

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### Teaching

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I'm currently teaching an undergraduate course "*Calculus for genomics*" (in English), inside the undergraduate degree in "*Genomics*":

<https://www.unibo.it/sitoweb/mirko.degliesposti/teachings>

In the past I have taught undergraduate and graduated courses in mathematical physics and its applications to life sciences.

## ● **INSTITUTIONAL ACTIVITIES**

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### Institutional Activities

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While keeping my research active, I've gained quite a lot of experience in the university system: my seven-year experience as Director of a large Department (2008-2015) and my current experience as deputy rector (from 2015) of a so-called public mega university such as the one of Bologna, have naturally and consciously allowed me to acquire skills and experience in the fields of research policy, research valorisation and in the administration and management of higher education institutions.

Since 2015 I have gained an in-depth and even transversal knowledge of University dynamic. This has allowed me to address in the first person all the most important and fundamental issues in the management and development of a higher education institution.

Just a few of them here:

1) *Enhancement of research and international attractiveness*: since 2015 I have been working, together with the Rector and the Research Pro-Rector, to increase the international attractiveness of the university, exploiting and encouraging the national measures in force, such as calls from abroad or direct calls for winners of competitive projects. I helped design a system of incentives and co-funding (to individuals and/or facilities) closely related to ministerial provisions, together with a targeted international communication campaign, which allowed us to considerably increase the quality and quantity of researchers and competitive projects attracted. The current experience of UNA-Europa (European network of 8 major universities) allows me to work on the three major missions of the University (research, teaching and third mission) in a concrete European and international context and perspective.

2) *Open Access and Open Science*: as a member of the Expert Group on Science 2.0/Open Science of the EUA (European University Association) and of the CRUI-CARE group (coordination access to electronic resources) I follow with particular interest the activities at national and European level concerning access to scientific resources and the more general topics of open science. I am particularly interested in the dynamics of transformation of publishing contracts, the economic and cultural impact on research communities and in general, the processes of transformation towards a FAIR (Findable, Accessible, Interoperable and Reusable) use of data.

3) *the relationship with the city and the territory*: there is no doubt that for a great institution of excellence the international context is the natural one for growth, comparison and innovation. However, I also consider fundamental, if not vital, the relationship with the territory, not only the relationship with the productive fabric through research and development, but also and above all the relationship with the cultural and social environment. I believe in the social role of science, the dissemination of science and fundamental sciences in addressing and narrating the challenges and transformations of our times.

## ● **HOBBIES AND INTERESTS**

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in the spare time, I bike....

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[https://www.facebook.com/mirko.esposti/photos\\_albums](https://www.facebook.com/mirko.esposti/photos_albums)