# Luca Fenzi

*Curriculum vitae*

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*luca.fenzi91*

## Personal Information

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|---|---|---|---|
| Address | Strijdersstraat 66 bus 103<br>3000 Leuven (BE) | Nationality | Italian |
| Birth | February 24, 1991. Verona (IT) | Gender | Male |

## Curriculum studiorum

2020 **PhD in Engineering Science**, *KU Leuven*, (BE), Computer Science Department - Numerical Analysis and Applied Mathematics research unit.
PhD Thesis: Looking for stability: Advances on spectrum-based stability and stabilization of uncertain linear time-delay systems (Supervisor: Prof. Wim Michiels).

2015 **Master's Degree in Mathematics**, *Università degli Studi di Udine*, (IT), Grade 110/110 with honors.

2015 **Diploma of Scuola Superiore**, *Università degli Studi di Udine*, (IT), Official diploma - Grade 110/110 with honors.
5-year board and lodging merit bursary for excellence, involving:
- an entrance examination for 10 places in all the scientific subjects, with a further failing rate of 50% of the students in the following five years
- dedicated courses and additional two exams every year, consisting of the dissertation of a research essay after delivering a speech

For further information www.scuolasuperiore.uniud.it

2015 **Erasmus exchange program**, *Norwegian University of Science and Technology (NTNU)*, Trondheim (NO).

2013 **Bachelor's Degree in Mathematics**, *Università degli Studi di Udine*, (IT), Grade 110/110 with honors.

2010 **High school diploma - Specialization in Mathematics and Computer Science**, *Scientific Lyceum "Galileo Galilei"*, Verona (IT), Grade 93/100.

## Work experience

2015–2020 **Graduate research assistant**, *KU Leuven*, (BE).
Further information in Curriculum studiorum

2010–2015 **Raft guide**, *Verona Rafting, Adige Rafting and Alpin Action FVG*, (IT).

2010 **Slalom Kayak Trainer**, *Canoa Club Verona*, (IT).

2008–2009 **Waiter**, *Pizzeria n5*, Verona (IT).

2007 **Technical worker**, *Digital Network*, Verona (IT).
Digital Network rents, sells and installs technical equipments for events, conventions and exhibitions. For further information www.digitalnetwork.it.

## Publications

2020 Luca Fenzi. *Looking for stability, advances on spectrum-based stability and stabilization of uncertain time-delay systems*. PhD thesis, KU Leuven, 2020.

2019 W. Michiles and Luca Fenzi. Spectrum-based stability analysis and stabilization of a class of time-periodic time-delay systems. *arXiv:1908.10280*, 2019.

2019 Luca Fenzi and W. Michiels. Polynomial (chaos) approximation of maximum eigenvalue functions. *Numerical Algorithms*, 82:1143–1169, 2019.

2018 Luca Fenzi and W. Michiels. Experiments on polynomial (chaos) approximation of maximum eigenvalue functions: Tutorial. Technical report, TW 688, Department of Computer Science, KU Leuven, 2018.

2017 Luca Fenzi, D. Pilbauer, W. Michiels, and T. Vyhlídal. A probabilistic approach towards robust stability optimization, with application to vibration control. In F. Stépán and G. Csernák, editors, *Proceedings of the 9th European Nonlinear Dynamics Conference*, 2017.

2017 Luca Fenzi and W. Michiels. Robust stability optimization for linear delay systems in a probabilistic framework. *Linear Algebra and its Applications*, 526:1–26, 2017.

## Computer skill

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|---|---|---|
| Matlab | Advanced knowledge | *Gained during the PhD and MathWorks workshop and advanced courses in Linear Algebra & Control Theory.* |
| R | Advanced knowledge | *Gained during advanced courses in Statistics.* |
| LaTeX | Advanced knowledge | *Gained during the PhD and exploited in several projects.* |
| HTML | Advanced knowledge | *Gained during the PhD program.* |
| C | Good knowledge | *Gained during the course of "Computer Science 1".* |
| Photoshop & Lightroom | Good knowledge | *Gained as an amateur photographer and with a course on Image Editing.* |
| Office Package | Good knowledge | *Gained from several projects.* |
| Mathematica | Basic knowledge | *Gained during the course of "Laboratory of Computational Mathematics".* |
| Geogebra | Basic knowledge | *Gained during the course of "Laboratory of Computational Mathematics".* |

## Languages

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|---|---|---|
| Italian | Native speaker | *Mother tongue* |
| English | Excellent command | *Level C1 (CEF), Certified by Scuola Superiore, improved by Pronunciation and Academic Writing PhD courses.* |
| Norwegian | Basic communication skills | *Level A1 (CEF), Certified by NTNU.* |
| Dutch | Basic communication skills | *Level A2 (CEF), Certified by Leuven Language Institute.* |

## Posts of responsibility

2019–present **Executive Board of Scuola Superiore Alumni Association**, *Udine*, (IT).

2017–2020 **Contributor in the Society of Industrial and Applied Mathematics (SIAM) student chapter**, *KU Leuven*, (BE).
For further information siam.cs.kuleuven.be

2015 **Reference group member for "Computer intensive statistical methods" and "Numerical solution of differential equations by difference methods"**, *Norwegian University of Science and Technology (NTNU)*, Trondheim (NO).

2013–2014 **Elected member inScuola Superiore Board**, *Università degli Studi di Udine*, (IT).

2013–2014 **Elected member in the Italian Network of Excellent Universitary Students Board**, *Italian Network of Excellent Universitary Students Board*.

2011–2014 **Elected member in Mathematics and Computer science Departmental Board and in the University Student Board**, *Università degli Studi di Udine*, (IT).
In office for two terms

2011–2012 **Elected member in Academic Senate**, *Università degli Studi di Udine*, (IT).

## Awards and achievement

2019 **Datathon: Data Analysis competition**, *Awarded by KU Leuven*, (BE).
Best Pitch and Second best PhD Team

2016 **Giulio Chiesi memorial prize for the best master thesis with engineering applications**, *Awarded by Università degli Studi di Udine*, (IT).

2016 **Prize for the best graduate student in Mathematics**, *Awarded by Università degli Studi di Udine*, (IT).
For further information www.uniud.it/merito.

2013 **Winner of a master scholarship in Engineering Mathematics**, *National Institute of Nuclear Physics (INFN), Gran Sasso Science Institue (GSSI) and University of L'Aquila (Univaq)* , (IT).
For further information www.gssi.inf.it. Proscribed in favor of Scuola Superiore scholarship.

2013 **Winner of the announcement for the study trip to CERN**, *ATLAS Udine Group*, Geneva (CH).
For further information www.atlas.uniud.it

2011 **Winner of the announcement of the Italian foreign minister for a English course in Malta**, *Embassy of Malta in Rome*, Valletta (MT).

2009–2010 **"National Olympics of Mathematics" - Team Competition & Individual finals**, *Project Olympics of Mathematics*, Cesenatico (IT).

## Hobbies

Sports *River kayak; Alpinism; Mountaineering; Cycling; Running.*

Miscellaneous *Travel; Analog and Digital Photography.*

## Attachments



## 1st Attachment: PhD Thesis

| | |
|---|---|
| Title | **Looking for stability** Advances on spectrum-based stability and stabilization of linear uncertain time-delay systems |
| Supervisor | Prof. Wim Michiels |
| Examination Committee | Prof. O. Van der Biest, Prof. D. Nuyens, Prof. G. Pipeleers, Prof. T. Vyhlídal & Dr. M. Voigt |
| Defence | February 2020 |
| Language | English |
| Pages | 130 |
| Keywords | Linear time-delay systems (autonomous and periodic); Dynamical systems stability and Control Theory; Uncertain Quantification; Eigenvalue problems; Polynomial approximation. |

## 2nd Attachment: Teaching Experience

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|---|---|
| 2017–2020 | **Teaching assistant of the master course Numerical Linear Algebra**, *KU Leuven*, (BE). |
| 2016–2017 | **Teaching Assistant of the master course Optimization**, *KU Leuven*, (BE). |
| 2013 | **Training lesson in preparation of the "National Olympics of Mathematics"**, *Mathesis*, Udine (IT). |

## 3rd Attachment: Conferences and Seminars

2019 **Talk: Alla ricerca della stabilità: migliorare la stabilità di sistemi dinamici con ritardo ottimizzando gli autovalori**, *1° Ritrovo Matematico degli Alumni della Scuola Superiore dell'Università degli Studi di Udine*, (IT).

2019 **Seminar: Periodic time-delay systems: stability and stabilization by spectrum-based approach**, *NUMA seminar at KU Leuven*, (BE).

2018 **Seminar: LaTeX Tips and Tricks**, *Society of Industrial and Applied Mathematics (SIAM) workshop*, Leuven (BE).

2018 **Talk: Polynomial (chaos) approximation of the spectral abscissa: efficiency and limitations**, *Time Delay Systems (TDS) 2018*, Budapest (HU).

2017 **Talk: A probabilistic approach towards robust stability optimization, with application to vibration control**, *European Nonlinear Dynamics Conference (ENOC) 2017*, Budapest (HU).

2017 **Talk: A probabilistic approach towards robust stability optimization, with applications**, *Workshop on Computational aspects of Time Delay System theory with Applications at CTU*, Prague (CR).

2017 **Talk: A probabilistic approach towards robust stability optimization, with applications**, *NUMA seminar at KU Leuven*, Leuven (BE).

2016 **Talk: Robust stability optimization for delay differential algebraic equations in a probabilistic framework**, *European Conference on Computational Optimization (EUCCO)*, Leuven (BE).

2016 **Attendance**, *Dynamical Systems, Control and Optimization (DYSCO) Study Day*, Louvain-la-Neuve (BE).

2016 **Attendance**, *System Structure and Control (SSSC) 2016 & Time Delay Systems (TDS) 2016*, Istanbul (TU).

2016 **Technical Assistant**, *International Linear Algebra Society (ILAS) 2016*, Leuven (BE).

2015 **Talk: Pedestrian Flows, Un nuovo modello**, *Rete di Idee*, Scuola Normale di Pisa and Sant'Anna (IT).

2012 **Talk: Esistenza del Trascendente, Dimostrazioni dell'esistenza di numeri e serie formali trascendenti**, *Rete di Idee*, ISUFI Lecce (IT).

## 4th Attachment: Doctoral Training

**Professional training courses**

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|---|---|
| An Introduction to Machine Learning and Deep Network Architectures | SOCN PhD course |
| Large scale convex and non-convex optimization | SOCN PhD course |
| Controlling Delayed Dynamics: Advances in Theory, Methods and Applications | CISM PhD course |
| Uncertainty Quantification Summer school | WIASS/GAMM/TUM PhD course |
| Sequential Monte Carlo Methods | SOCN PhD course |
| Robust Statistics | KU Leuven master course |
| Orthogonal Polynomials & Random Matrices | KU Leuven master course |

**Soft skills courses**

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|---|---|
| Seminar on Scientific Integrity | KU Leuven |
| Teacher Assistant training | KU Leuven |
| Pronunciation and Intonation | ILT & KU Leuven |
| Image Editing | Somersault & KU Leuven |
| Academic Writing | ILT & KU Leuven |
| Effective Graphical Displays | Principiae |
| Seminar: Getting the message across | Principiæ & KU Leuven |
| Seminar: Creating effective poster | Principiæ & KU Leuven |
| Photography courses *beginner-intermediate-advance* | Photography Club KU Leuven |

## 5th Attachment: Master thesis

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|---|---|
| Title | **Polynomial Chaos Theory: *Application to the stability of Uncertain Delay Differential Equations*** |
| Supervisor | Prof. Rossana Vermiglio |
| Year | 2015 |
| Grade | 110/110 with honor |
| Language | English |
| Pages | 140 |
| Nature | Research work |
| Keywords | Polynomial Chaos Theory; Uncertain Delay Differential Equations; Stability; Non-intrusive methods; Sparse and tensor grids. |

## 6th Attachment: Bachelor thesis

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|---|---|
| Title | **Relativistic Thermodynamics** |
| Supervisor | Prof. Sebastiano Sonego |
| Year | 2013 |
| Grade | 110/110 with honor |
| Language | English |
| Pages | 80 |
| Nature | Research work |
| Keywords | Thermodynamics; Special theory of Relativity; Distributions; Temperature and Lorentz transformations. |

## 7th Attachment: Compositions and projects for Scuola Superiore

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|---|---|
| Title | **Pedestrian Flow: *Controlled Random Walk Model*** |
| Supervisors | **Prof. Cristian Marchioli** and **Prof. Francesco Zonta** |
| Grade (Date) | 30/30 with honor (2014) |
| Keywords | Pedestrian flow; Random walk; Particle flow; Simulation; Dynamic programming. |
| Title | **Pseudo Random Number Generator** |
| Supervisor | **Prof. Dimitri Breda** |
| Grade (Date) | 30/30 with honor (2014) |
| Keywords | Pseudo Random Number Generators; Alghorithms; Congruence; Primitive root. |
| Title | **Boltzmann's Equation** |
| Supervisor | **Prof. Sebastiano Sonego** |
| Grade (Date) | Approved (2014) |
| Keywords | Boltzmann equation; H-theorem; non-relativistic and relativistic elastic collision. |
| Title | **Non-standard Analysis** |
| Supervisor | **Prof. Stefano Ansoldi** |
| Grade (Date) | 30/30 with honor (2013) |
| Keywords | Non-standard Analysis; Mathematics education; hyper-real field; topology. |
| Title | **Exorcisms of a Demon** |
| Supervisor | **Prof. Sebastiano Sonego** |
| Grade (Date) | 30/30 (2012) |
| Keywords | Maxwell's demon; Second law of thermodynamics; Quantum mechanics; Entropy and Information. |
| Title | **Existence of transcendental numbers and formal power series** |
| Supervisor | **Prof. Pietro Corvaja** |
| Grade (Date) | 28/30 (2011) |
| Keywords | Transcendental numbers; formal power series; Liouville's, Cantor's, and Lindemann-Weierstrass' theorems. |

## 8th Attachment: Master degree transcript

Weighted average 29,714/30 on 120 ECTS

| | |
|---|---|
| Statistics 1 | 30/30 with honor |
| Statistics 2 | 30/30 with honor |
| Probability 2 | 30/30 |
| Numerical Analysis 2 | 28/30 |
| Numerical Analysis 4 | 30/30 with honor |
| Laboratory of Computational Mathematics | 30/30 with honor |
| Advanced Algorithms | 30/30 |
| Differential Equations | 30/30 |
| Institution of Superior Calculus | 29/30 |
| Institution of Superior Geometry | 30/30 |
| Laboratory of Mathematics | Approved |
| Numerical solution of differential equations by difference methods | A (30/30 with honor) |
| Computer Intensive Statistical Methods | A (30/30 with honor) |
| Stochastic Population Models | A (30/30 with honor) |
| Thesis | Approved |

## 9th Attachment: Scuola Superiore diploma transcript

**Disciplinary courses**

Introduction to Number Theory and Applications to Computer Science
Transport Phenomena in Biological Systems
Introduction to Bifurcation Theory
Probability in Physics
Theoretical Physics
Game Theory
Numerical Methods for Transport Equations
Computational Analytic Geometry
Stochastic Methods in Physics

**Interdisciplinary courses**

Introduction to Philological Method
Philosophy of Religion - The Experience of the Divine
History of Science
Introduction to DNA structure
Physics and Philosophy

## 10th Attachment: Bachelor degree transcript

Weighted average 28,593/30 on 180 ECTS

| | |
|---|---|
| Physics 1 | 30/30 with honor |
| Physics 2 | 30/30 with honor |
| Physics 3 | 30/30 with honor |
| Modern Physics | 30/30 |
| Particles and Fundamental Interactions | 30/30 with honor |
| Rational Mechanics | 25/30 |
| Calculus 1 | 30/30 with honor |
| Calculus 2 | 30/30 |
| Differential Equations | 30/30 |
| Computer Science 1 | 30/30 |
| Computer Science 2 | 30/30 |
| Numerical analysis 1 | 30/30 |
| Optimization 1 | 30/30 |
| Arithmetic | 30/30 |
| Algebra 1 | 30/30 |
| Galois'Theory | 24/30 |
| Probability 1 | 28/30 |
| Logical Mathematics | 28/30 |
| Geometry 1 | 27/30 |
| Geometry 2 | 25/30 |
| Efficient Communication | Approved |
| Knowledge about business | Approved |
| English Language | Approved |
| Computer tools for Mathematics | Approved |
| Thesis | Approved |