

Curriculum vitæ

Maurizio Parton

- **Address:** Department of Economic Studies,
University of Chieti–Pescara,
viale Pindaro 42, I-65127 Pescara, Italy
e-mail: maurizio.parton@unich.it

Education

- **April 27, 2001:** PhD in Mathematics, University of Pisa, Italy.
- **May, 1995:** MSc in Mathematics, University of Rome “La Sapienza”, Italy, 110/110 summa cum laude.

Employment history

- **December 2015–today:** Associate Professor at the Department of Economic Studies, University of Chieti–Pescara, Italy.
- **November, 2012–2015:** Assistant Professor at the Department of Economic Studies, University of Chieti–Pescara, Italy.
- **November, 2002–2012:** Assistant Professor at the Department of Sciences, University of Chieti–Pescara, Italy.
- **February, 2003:** Visiting Professor at the Department of Mathematics of University of California at Riverside, USA.
- **March–August, 2002:** Postdoctoral research position at Institute of Mathematics and Computer Science (IMADA), Odense, Denmark (EDGE network, contract HPRN-CT-2000-00101).
- **September, 2001–October, 2002:** High school teacher, Italy.
- **August, 2001:** Postdoctoral research position at the Institute of Mathematics “Simion Stoilow” of the Romanian Academy (IMAR), Bucharest, Rumania (EURROMMAT programme, contract ICA1-CT-2000-70022).
- **May–July, 2001:** Postdoctoral research position at the Center of Mathematics, Ecole polytechnique, Paris, France (EDGE network, contract HPRN-CT-2000-00101).
- **2000:** Research contract at the Department of Mathematics “G. Castelnuovo”, University of Rome “La Sapienza”, Italy.

Research Interests

Differential Geometry. In particular:

- Complex differential geometry related to almost complex structures (8, 11, 12, 1, 14, 15, 16, 17, 18, 19, 21, 24, 26, 27, 28, 29).
- Riemannian geometry related to parallelizable manifolds (8, 10, 29).
- Structures that are locally conformally equivalent to special structures, for instance locally conformally Kähler and locally conformally symplectic structures (5, 10, 16, 19, 24, 25, 26, 28).
- Clifford structures, in particular the ones related to Spin(9)-structures and their extensions to Rosenfeld planes (12, 14, 15, 18, 21).
- Octonionic geometry, in particular its relation with never-vanishing vector fields on spheres (8, 12, 14, 17, 18, 21).

Lie groups and Lie algebras. In particular, I am interested in properties of the above-mentioned structures in the invariant case. My focus is mainly on nilmanifolds, and occasionally on solvmanifolds (10, 27).

Number theory. In particular, I love its intersection with differential geometry showed by Oeljeklaus-Toma manifolds (1, 19). I'm also curious about simple but still unsolved problems like the existence of infinitely many primitive weird numbers (7, 13).

Computer science and logic. In particular:

- Artificial intelligence, in particular neural networks trained by reinforcement learning algorithms (2, 6, 4, 9).
- Abstract interpretation, and its intersection with geometry (20, 22, 23).
- Assisted theorem proving, in particular with Coq and its univalent version UniMath (3).

Recent interests. I'm also interested in quaternionic analogues of holomorphic functions, in particular slice-regular functions, and in artificial intelligence applied to biology. I don't have any research papers on these topics yet.

Publications

1. Daniele Angella, Maurizio Parton, Victor Vuletescu, *Rigidity of Oeljeklaus-Toma manifolds*, to appear on **Annales de l'Institut Fourier**.
2. Luca Pasqualini, Maurizio Parton, *Pseudo Random Number Generation through Reinforcement Learning and Recurrent Neural Networks*, arXiv:2011.02909 [cs.CR].
3. Gianluca Amato, Marco Maggesi, Maurizio Parton, Cosimo Perini Brogi, *Universal Algebra in UniMath*, arXiv:2007.04840 [cs.LO]. **HoTT/UF 2020 workshop**.
4. Francesco Morandini, Gianluca Amato, Marco Fantozzi, Rosa Gini, Carlo Metta, Maurizio Parton, *SAI: a Sensible Artificial Intelligence that plays with handicap and targets high scores in 9x9 Go*, arXiv:1905.10863 [cs.AI]. **ECAI 2020 conference**.
5. Daniele Angella, Maurizio Parton, Victor Vuletescu, *On locally conformally Kähler three-folds with algebraic dimension two*, arXiv:2005.09565 [math.DG].

6. Luca Pasqualini, Maurizio Parton, *Pseudo Random Number Generation: a Reinforcement Learning approach*, arXiv:1912.11531 [cs.CR]. **Procedia Computer Science**, (2020), **170**, 1122–1127.
7. Gianluca Amato, Maximilian Hasler, Giuseppe Melfi, Maurizio Parton, *Primitive abundant and weird numbers with many prime factors*, **Journal of Number Theory**, (2019), **201**, 436–459.
8. Maurizio Parton, Paolo Piccinni, *Parallelizations on products of spheres and octonionic geometry*, **Complex Manifolds**, (2019), **6(1)**, 138–149.
9. Francesco Morandin, Gianluca Amato, Rosa Gini, Carlo Metta, Maurizio Parton, Gian-Carlo Pascutto, *SAI, a Sensible Artificial Intelligence that plays Go*, arXiv:1809.03928 [cs.AI]. **2019 International Joint Conference on Neural Networks**.
10. Daniele Angella, Giovanni Bazzoni, Maurizio Parton, *Structure of locally conformally symplectic Lie algebras and solvmanifolds*, **Annali della Scuola Normale di Pisa - Classe di Scienze**, (2018), **5**.
11. Panagiotis Konstantis, Maurizio Parton, *Almost complex structures on spheres*, **Differential Geometry and its Applications**, (2018), **57**, 10–22.
12. Maurizio Parton, Paolo Piccinni, *The role of $Spin(9)$ in octonionic geometry*, **Axioms**, (2018), **7(4)**, 72, 1–32.
13. Gianluca Amato, Maximilian Hasler, Giuseppe Melfi, Maurizio Parton, *Primitive weird numbers having more than three distinct prime factors*, **Rivista di Matematica Università di Parma**, (2016), **7**, 153–163.
14. Maurizio Parton, Paolo Piccinni, Victor Vuletescu, *Clifford systems in octonionic geometry*, **Rendiconti del Seminario Matematico Università e Politecnico di Torino**, (2016), **74, I**, 267–288.
15. Maurizio Parton, Paolo Piccinni, *The even Clifford structure of the fourth Severi variety*, **Complex Manifolds**, (2015), **2(1)**, 89–104.
16. Liviu Ornea, Maurizio Parton, Victor Vuletescu, *Holomorphic submersions of locally conformally Kähler manifolds*, **Annali di Matematica Pura ed Applicata**, (2014), **193, 5**, 1345–1351.
17. Liviu Ornea, Maurizio Parton, Paolo Piccinni, Victor Vuletescu, *$Spin(9)$ geometry of the octonionic Hopf fibration*, **Transformation Groups** (2013), **18, 3**, 845–864.
18. Maurizio Parton, Paolo Piccinni, *Spheres with more than 7 vector fields: all the fault of $Spin(9)$* , **Linear Algebra and Its Applications** (2013), **438**, 1113–1131.
19. Maurizio Parton, Victor Vuletescu, *Examples of non-trivial rank in locally conformal Kähler geometry*, **Mathematische Zeitschrift** (2012), **270, 1**, 179–187.
20. Gianluca Amato, Maurizio Parton, Francesca Scozzari, *Discovering invariants via simple component analysis*, **Journal of Symbolic Computation** (2012), **47**, 1533–1560.
21. Maurizio Parton, Paolo Piccinni, *$Spin(9)$ and almost complex structures on 16-dimensional manifolds*, **Annals of Global Analysis and Geometry** (2012), **41, 3**, 321–345.

22. Gianluca Amato, Maurizio Parton, Francesca Scozzari, *A tool which mines partial execution traces to improve static analysis*, **Lecture notes in computer science** (2010), **6418**, 475–479.
23. Gianluca Amato, Maurizio Parton, Francesca Scozzari, *Deriving numerical abstract domains via Principal Component Analysis*, **Lecture notes in computer science** (2010), **6337**, 134–150.
24. Rosa Gini, Liviu Ornea, Maurizio Parton, Paolo Piccinni, *Reduction of Vaisman structures in complex and quaternionic geometry*, **Journal of geometry and physics** (2006), **56**, **12**, 2501–2522.
25. Stefan Ivanov, Maurizio Parton, Paolo Piccinni, *Locally conformal parallel G_2 and $Spin(7)$ manifolds*, **Mathematical Research Letters** (2006), **13**, **2**, 167–177.
26. Rosa Gini, Liviu Ornea, Maurizio Parton, *Locally conformal Kähler reduction*, **Journal für die Reine und Angewandte Mathematik** (2005), **581**, 1–21.
27. Anna Fino, Maurizio Parton, Simon Salamon, *Families of strong KT structures in six dimensions*, **Commentarii Mathematici Helvetici** (2004), **2**, 317–340.
28. Maurizio Parton, *Hopf surfaces: locally conformal Kähler metrics and foliations*, **Annali di Matematica Pura ed Applicata** (4), **182**, (2003), **3**, 287–306.
29. Maurizio Parton, *Explicit parallelizations on products of spheres and Calabi-Eckmann structures*, **Rendiconti dell’Istituto di Matematica dell’Università di Trieste**, (2003), **XXXV**, 61–67.
30. Maurizio Parton, *Strutture hermitiane e speciali su prodotti di sfere*, **Bollettino U.M.I.**, “La matematica nella Società e nella Cultura”, serie VIII, Volume IV-A, December 2001, 523–526.
31. Maurizio Parton, *Old and New Structures on Products of Spheres*, Global differential geometry: the mathematical legacy of Alfred Gray (Bilbao, 2000), 406–410, **Contemp. Math.**, 288, Amer. Math. Soc., Providence, RI, 2001.
32. Maurizio Parton, *Hermitian and special structures on products of spheres*, PhD Thesis, April 2001, Department of Mathematics “L. Tonelli”, University of Pisa, Italy.
33. Maurizio Parton, *Classi combinatorie di Pontrjagin e strutture non standard su S^7 e $S^1 \times S^7$* , dissertation for “Laurea”, University of Rome “La Sapienza”, Italy, 1995.

Funded Research Projects

- Principal investigator of the research project “SAI: a Sensible Artificial Intelligence winning Weiqi games with arbitrary komi”, sponsored by “Qi Culture 8+X Projects”, China. 2018.
- National PRIN project (Italian research projects funded by ministry of education) 2010-2011, coordinator Fulvio Ricci. 01 January 2011 - 31 December 2013.
- National PRIN project (Italian research projects funded by ministry of education) 2010-2011, coordinator Simon Salamon. 01 January 2008 - 31 December 2010.
- National PRIN project (Italian research projects funded by ministry of education) 2010-2011, coordinator Simon Salamon. 01 January 2005 - 31 December 2007.

- European Network “European Differential Geometry Endeavour”, (EDGE, 2000-2004), HPRN-CT-2000-00101. 01 March 2002 - 31 December 2004.

Workshop organization

- **July 2019:** “6th Ph.D. School/Conference on Mathematical Modeling of Complex Systems”, Pescara, Italy.
- **August 2018:** “International Conference on Research in Mind Games”, Pisa, Italy.
- **June 2018:** “Complex Geometry and Lie Groups”, Firenze, Italy.
- **February 2018:** “MATE - Maieutica, Arte, Tecnologie, Economia”, Pescara, Italy.
- **March 2017:** “A Differential Geometry Day in Rome”, Rome, Italy.
- **February 2017:** “Geometry and Computer Science”, Pescara, Italy.
- **May 2016:** “A Differential Geometry Day in memory of Sergio Console”, Torino, Italy.
- **February 2015:** “Workshop in memory of Sergio Console”, Torino, Italy.
- **September 2014:** “New Trends in Differential Geometry 2014”, Cagliari, Italy.
- **September 2011:** “New Trends in Differential Geometry”, L’Aquila, Italy.
- **June, 2009:** “Kähler and Sasakian Geometry in Rome”, Rome, Italy.
- **June, 2006:** “Giornata di Geometria Differenziale Pescara”, Pescara, Italy.

Talks

- **November 2020:** “Machine Learning and Data Mining”, workshop of the 19th International Conference of the Italian Association for Artificial Intelligence. ONLINE.
- **November 2019:** “Google DevFest 2019”, Galway, Ireland.
- **November 2019:** “Machine Learning and Data Mining”, workshop of the 18th International Conference of the Italian Association for Artificial Intelligence, Cosenza, Italy.
- **March 2017:** “(Non)-existence of complex structures on S^6 ”, Marburg, Germany.
- **December 2016:** “UNINT conferences at LabSciMat”, Rome, Italy.
- **September 2016:** “1st Joint Meeting Brazil - Italy in Mathematics”, Rio De Janeiro, Brasil.
- **May 2016:** “LCK geometry: introduction”, Pisa, Italy.
- **March 2015:** “Geometric and Algebraic Methods in Mathematical Physics”, Dortmund, Germany.
- **March 2015:** “Varietà reali e complesse: geometria, topologia e analisi armonica”, PRIN workshop, Pisa, Italy.
- **September 2014:** “Real and Complex Differential Geometry”, Bucarest, Rumania.
- **May 2014:** “47th Seminar Sophus Lie”, Marburg, Germany.

- **August 2014:** “Geometry seminar”, Miami, Florida, USA.
- **February 2014:** “Carnival Differential Geometry”, Turin, Italy.
- **February 2013:** “Varietà reali e complesse: geometria, topologia e analisi armonica”, PRIN workshop, Pisa, Italy.
- **May 2012:** “Manifolds with Special Holonomy and their Calibrated Submanifolds and Connections”, Banff, Canada.
- **September 2011:** “New Trends in Differential Geometry”, L’Aquila, Italy.
- **October 2008:** “Metriche Riemanniane e Varietà Differenziabili”, Turin, Italy.
- **March, 2006:** “Special Geometries in Mathematical Physics”, Kühlungsborn, Germany.
- **July 2004:** “Short program on Riemannian Geometry”, Montreal, Canada.
- **March 2003:** “Geometry seminar”, Albuquerque, New Mexico.
- **February 28, 2003:** “Differential geometry seminar”, Riverside, California.
- **February 7, 2003:** “Differential geometry seminar”, Riverside, California.
- **September 2002:** “Proprietà Geometriche delle Varietà Reali e Complesse: Nuovi Contributi Italiani III”, Palermo, Italy.
- **May 2002:** “Topology/Geometry seminar”, Department of Mathematical Sciences, Aarhus, Denmark.
- **April 2002:** “Institut for Matematik og Datalogi (IMADA)”, Odense, Denmark.
- **August 2001:** “1-st IMAR Workshop: Algebraic Geometry, Commutative Algebra and Topology”, Pitesti, Rumania.
- **April 2001:** “Centre de Mathématiques, Ecole polytechnique”, Paris, France.
- **September 2000:** “International Congress on Differential Geometry in memory of Alfred Gray”, Bilbao, Spain.
- **June 2000:** University of Bucharest, Rumania.
- **September 1999:** “Proprietà Geometriche delle Varietà Reali e Complesse: Nuovi Contributi Italiani”, Palermo, Italy.

Recent schools

- **April 2019** “School and Workshop on Univalent Mathematics”, Birmingham, UK.

Mentorships, PhD courses, graduate courses

- Advisor of more than 70 bachelor thesis.
- **July 2020:** “Reinforcement Learning”, 8 hours module at Master of level II “Customer Experience, Statistics, Machine Learning & Artificial Intelligence”, organized by Department of Economics and Finance, Tor Vergata University, Roma, Italy. ONLINE.

- **2019–2020:** “Apprendimento per rinforzo / Reinforcement Learning” PhD course at Firenze University. Department of Mathematics and Computer Science, Firenze, Italy. ONLINE.
- **2018–2019:** “Reinforcement Learning” PhD course at Siena University. Department of Information Engineering and Mathematical Sciences, Siena, Italy.
- **April 2019:** “Reinforcement Learning”, 6 hours module at Master of level II “Customer Experience & Social Media Analytics”, organized by Department of Economics and Finance, Tor Vergata University, Roma, Italy.
- **2017–2018:** “Calculus and Linear Algebra” PhD course at Sant’Anna School of Advanced Studies, Pisa, Italy.

Undergraduate teaching

Paralleling my various interests, I have experience in teaching undergraduate courses on a broad range of topics beyond general mathematics. In particular, I taught **Finance, Game Theory, Neural Networks, Logic and Discrete Mathematics**. In October I started a brand-new course mixing game theory and artificial intelligence.

- **2019–2020:** “Matematica Generale” (9 CFU), “Giochi Combinatori e Machine Learning” (6 CFU) courses.
- **November 2019:** Crash course, 3 hours: “Neural networks and Deep Learning: recent advances in Artificial Intelligence”, LUISS, Roma, Italy.
- **2018–2019:** “Matematica Generale” (9 CFU), “Teoria dei Giochi Combinatori” (6 CFU) courses.
- **November 2018:** Crash course, 3 hours: “Neural networks and Deep Learning: recent advances in Artificial Intelligence”, LUISS, Roma, Italy.
- **August 2018:** Crash course, 4 hours: “Introduction to Neural Networks for Mathematicians”, SNS, Pisa, Italy.
- **2017–2018:** “Matematica Generale” (9 CFU), “Geometria” (6 CFU) courses.
- **2016–2017:** “Analisi Matematica” (7 CFU), “Matematica Discreta e Logica Matematica” (6 CFU) courses.
- **2013–2016:** “Matematica Finanziaria” (6 CFU), “Matematica Discreta” (9 CFU) courses.
- **2011–2013:** “Matematica Generale” (9 CFU) course.
- **2009–2010:** “I giochi astratti ed il Go”, (1 CFU).
- **2008–2009:** “Il Go tra gioco, matematica ed economia”, (1 CFU).
- **2004–2011:** “Matematica Finanziaria” course.
- **2002–2004:** “Matematica Generale” course.
- **September, 2001–October, 2002:** High school teaching.
- **April–May, 2002:** Geometry 3, with A. Swann e A. Fino at “Institut for Matematik og Datalogi (IMADA)”, Odense, Denmark.

I also have teaching experience in non-academic settings, such as dissemination conferences, courses for high school students, and professional training.

- **January 2020:** “Introduzione a AlphaGo Zero”, Pisa, Italy.
- **December 2019:** “Introduzione alle reti neurali”, Pisa, Italy.
- **December 2019:** “Reinforcement Learning”, 20 hours module at “Master on Machine Learning”, organized by Experis Academy, Bergamo, Italy.
- **December 2019:** “Do humans dream of creative machines?”, Pisa, Italy.
- **November 2019:** “Introduzione all’intelligenza artificiale oggi”, Pisa, Italy.
- **September 2019:** “Deep Learning e AlphaGo”, Milano, Italy.
- **June 2019:** “Reti neurali e Deep Learning”, Pescara, Italy.
- **May 2019:** “Errare è umano ma non solo: passato, presente e futuro dell’intelligenza artificiale”, 4 hours mini-workshop, Chieti, Italy.
- **April 2019:** “Reinforcement Learning”, 6 hours module at “Master on Big Data Analytics Professionals”, organized by Masterandskills Business School, in partnership with Sapienza University, Roma, Italy.
- **February 2019:** “Reinforcement Learning”, 16 hours module at “Master on Deep Learning”, organized by Experis Academy, Roma, Italy.
- **January 2019:** “Il gioco del Go e l’intelligenza artificiale”, Pisa, Italy.
- **November 2018:** “Reti Neurali, apprendimento e giochi combinatori”, Milano, Italy.
- **September 2018:** “AlphaGo e Deep Learning, ovvero: perché l’IA avanza così velocemente?”, at “Notte dei Ricercatori”, Pescara, Italy.
- **May 2018:** “Deep Learning e AlphaGo”, Roma, Italy.
- **April 2018:** “IA ieri e oggi: perché sta migliorando così velocemente?”, opening conference at Campus MFS, organized by “Scuola di Formazione Scientifica Luigi Lagrange”, Marina di Massa, Massa, Italy.
- **April 2018:** “Deep Learning e AlphaGo”, Milano, Italy.
- **March 2018:** “Deep Learning e AlphaGo”, Pisa, Italy.
- **January 2018:** “Il gioco del Go e l’intelligenza artificiale”, Pisa, Italy.
- **September 2017:** “IA ieri e oggi: perché sta migliorando così velocemente?”, at “Notte dei Ricercatori”, Pescara, Italy.
- **May 2017:** Crash course, 10 hours: “Il gioco combinatorio e i computer”, organized by “Scuola di Formazione Scientifica Luigi Lagrange”, Marina di Massa, Massa, Italy.
- Maurizio Parton, *La vittoria dell’IA su Lee Sedol? È solo l’inizio!*, **MATE journal**, (2016), 14–19.
- **July 2016:** Crash course, 6 hours: “Cade l’ultimo baluardo: Google batte campione di Go”, organized by “Scuola di Formazione Scientifica Luigi Lagrange”, Bardonecchia, Turin, Italy.

- **May 2016:** “Go, l’uomo e i computer: quando l’allievo digitale supera il maestro”, Pisa, Italy.
- **May 2016:** “Cade l’ultimo baluardo: Google batte campione di Go”, organized by “Olimpiadi Nazionali di Matematica”, Cesenatico, Italy.
- **March 2016:** “Il Go e l’intelligenza artificiale”, organized by “Olimpiadi Nazionali di Matematica”, University of Parma, Italy.
- **March 2016:** “La sfida tra supercomputer e campione mondiale”, organized by CNR, Pisa, Italy.

Referee activities

Referee for several international journals:

- Advances in Geometry
- Annals of Global Analysis and Geometry
- Complex Manifolds
- Communications in Contemporary Mathematics
- Geometriae Dedicata
- Journal of Geometry and Physics
- Journal of Mathematics Research
- Manuscripta Mathematica
- Mathematical Research Letters
- Mathematische Annalen
- Symmetry, Integrability and Geometry: Methods and Applications
- Transformation Groups
- Vietnam Journal of Mathematics

Other activities

- Since September 2019, I have the **Italian “abilitazione” for full professor**.
- Since 2018, I’m a Deep Learning Italia instructor www.deeplearningitalia.com.
- Since 2013, I’m president of the Italian Go association. I organized several Go tournaments. In particular, I organized the “2018 European Go Congress” www.egc2018.it, a **2-weeks long event with more than 1200 participants**.
- I’m web manager of various web sites (workshops, degree courses, mathematical dissemination).
- Institutional tasks at University of Chieti-Pescara: president of “Commissione Pratiche studenti”, member of “Gruppo di Assicurazione della Qualità”.

- I routinely organize activities for students at University of Chieti-Pescara: for instance, “Torneo di Trading” (since 2013), seminars on cryptocurrencies, blockchain, artificial intelligence, finance, events on the game of Go.

Languages

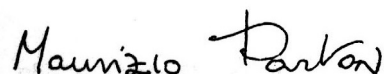
- Native Italian speaker.
- English (good).
- French (basic).
- Japanese: basic level (JLPT N5).

Computer skills

- Programming languages: Python, TensorFlow, Java, C, C++, BASIC, HTML, \TeX and \LaTeX .
- Operating Systems: Linux and Microsoft Windows.
- Software tools: Mathematica, SageMath, Coq, UniMath.

Pisa, December 28, 2019

Maurizio Parton

A handwritten signature in black ink that reads "Maurizio Parton". The signature is written in a cursive style with a large, stylized 'P'.