Riccardo FINOTELLO

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Personal Data

Place of birth: Torino, Italy Date of birth: July, 13th 1993 Citizenship: Italian

Work address: Commissariat à l'Energie Atomique et aux énergies alternatives,
DES/ISAS/DPC/SEARS/LANIE, Bât. 467 p. 104,
F-91191 Gif sur Yvette CEDEX,
France

Research interests: machine learning, artificial intelligence, data science, spectroscopy, chemometrics, algebraic geometry, string theory, conformal field theory

Description: I am currently involved in applications of AI to experimental data, specifically for spectroscopy and chemometrics, where the possibility of applying data-driven learning models may lead to improvements in quantification and detection. I am also interested in applications of AI methods for the resolution of mathematical problems, where I contribute by introducing models inspired by advancements in computer vision and natural language processing. I studied viable methods for the computation of phenomenological amplitudes in string theory to which I contributed with the analysis of particle physics scenarios and to the study of cosmological backgrounds.

Personal website: https://thesfinox.github.io

Work Experience

02/2021 – present: **Post-doctoral Researcher**
Commissariat à l'Energie Atomique et aux énergies alternatives, Saclay, France
Description: joint post-doc (PTC) with the *Direction des énergies* (DES/ISAS/DPC/SEARS/LANIE) and the *Direction de la recherche technologique* (DRT/LIST/DIASI/SIALV/LVML).

10/2017 – 12/2020: **Ph.D. Graduate Researcher**
Università degli Studi di Torino, Italy
Description: research in theoretical physics (string theory) and AI applications.

10/2017 – 10/2020: **Scientific Associate Researcher**
I.N.F.N. (*National Institute for Nuclear Physics*), Torino, Italy
Description: scientific association as Ph.D. student.

10/2018 – 07/2020: **Teaching Assistant**
Università degli Studi di Torino, Italy
Description: tutorship and exercise sessions for students of the B.Sc. in Physics.

Education

10/2017 – 12/2020 **Ph.D. Fellow in Physics and Astrophysics**
Università degli Studi di Torino, Italy
Advisor: Igor Pesando
Thesis: *D-branes and Deep Learning: Theoretical and Computational Aspects In String Theory*
Defended: December, 18th 2020

10/2015 – 10/2017: **M.Sc. in Physics**
Università degli Studi di Torino, Italy
Curriculum: theoretical physics
Dissertation: *Standard Model–like Scenarios in String Theory: Non Abelian D-brane Rotations and the Classical Bosonic String*
Final grade: 110/110 *cum laude*

10/2012 – 07/2015: **B.Sc. in Physics**
Università degli Studi di Torino, Italy
Dissertation: *Perturbative Analysis: Resurgent Transeries and Hyperasymptotics*
Final grade: 110/110 *cum laude*

Visits, Training and Internships

12/2018 **Winter school and research visit**
Location: Galileo Galilei Institute for Theoretical Physics (Arcetri, Firenze, Italy)

12/2017 - 01/2018 **Winter schools and research visit**
Location: Galileo Galilei Institute for Theoretical Physics (Arcetri, Firenze, Italy)

01/2017 - 10/2017: **I.N.F.N. training for the M.Sc. degree**
Location: National Institute for Nuclear Physics (I.N.F.N., Torino, Italy)

04/2015 - 06/2015: **I.N.F.N. training for the B.Sc. degree**
Location: National Institute for Nuclear Physics (I.N.F.N., Torino, Italy)

Fellowships, Grants and Distinctions

2020: grant as teaching assistant of the *Università degli Studi di Torino* (6 months, from 01/2020)

2019: student elected in the *Department Council* as Ph.D. representative

2018: student elected in the *Department Council* as Ph.D. representative

2017: Ph.D. scholarship assigned by the *Università degli Studi di Torino* (3 years, from 10/2017)

Teaching Experience and Outreach Activity

01/2020 – 07/2020: **Teaching Assistant in Physics**
Grant: *Università degli Studi di Torino*
Course: *Physics 1* (1st year B.Sc. in Physics)
Competences: tutorials and exercise sessions

01/2019 – 07/2019: **Teaching Assistant in Physics**
Course: *Waves, Fluids and Thermodynamics* (1st year B.Sc. in Physics)
Competences: tutorials and exercise sessions

11/2015: **Teaching Staff**
Course: *Physics at LHC* (outreach project for high school students)
Funds: *Piedmont* regional grant for Italian scientific schools
Competences: lectures and exercises on high energy physics (in English)

Coursework and Certifications

12/2020: **Reinforcement Learning**
University of Alberta (via Coursera.org — credential ID: X6QTKFZDEGB2)

Fundamentals of Reinforcement Learning	(credential ID: SA4PFAGGR6B5)
Sample-based Learning Methods	(credential ID: KCPZAVVUT98A)
Prediction and Control with Function Approximation	(credential ID: 3L9BL5LH9K4H)
A Complete Reinforcement Learning System (Capstone)	(credential ID: C5JFZB5AGF4C)

10/2020: **Data Science Specialisation**
John Hopkins University (via Coursera.org — credential ID: QDGGFSKG8VVS)

The Data Scientist's Toolbox	(credential ID: J6VC2AZMGGUG)
R Programming	(credential ID: 8D7TP7FHQWK2)
Getting and Cleaning Data	(credential ID: E3KT2J9HPKGR)
Exploratory Data Analysis	(credential ID: 3GYQ9UQQS3JX)
Reproducible Research	(credential ID: 84LX7JZYKR9W)
Statistical Inference	(credential ID: 2CSSYG79AQ2W)
Regression Models	(credential ID: YGGYSZZXM46R)
Practical Machine Learning	(credential ID: J9MXMYRQ47ZD)
Developing Data Products	(credential ID: 2CEYYPDYG7PB)
Data Science Capstone	(credential ID: SCJFP5JM34HR)

06/2020: **AI for Medicine**
deeplearning.ai (via Coursera.org — credential ID: ZXW8Y3UU4UCY)

AI for Medical Diagnosis	(credential ID: GPNE8X3862JX)
AI for Medical Prognosis	(credential ID: 8NPQDS4UFMJF)
AI for Medical Treatment	(credential ID: 52YHADQMZCM8)

05/2020: **Deep Learning**
deeplearning.ai (via Coursera.org — credential ID: N2FWFZ9W42V2)

Neural Networks and Deep Learning	(credential ID: XFKPYRXVVEKN)
Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization	(credential ID: ED599JTBLVX2)
Structuring Machine Learning Projects	(credential ID: 8KXABGGZWRER)
Convolutional Neural Networks	(credential ID: 2ZBR9Q9JLVAL)
Sequence Models	(credential ID: LP9WPTVB4KV3)

04/2020: **Machine Learning**
University of Standford (via Coursera.org — credential ID: SDLSE9NP4XMH)

IT Skills

Programming languages:	Python, R, C++, PHP, Javascript, ROOT, Matlab/Octave, Maxima, Wolfram Mathematica, Java
Markup and scripting languages:	bash, HTML, Markdown, RMarkdown
Operating Systems and Distributions:	Arch Linux (main distribution), Ubuntu, Debian, CentOS, Microsoft Windows
Shell:	bash, zsh, PowerShell
Modules and libraries:	Scipy ecosystem, Scikit-learn, Scikit-optimize, Tensorflow (Keras), PyTorch, LightGBM, XGBoost, Tidyr, Caret, Leaflet, Plotly, GMP, MPFR
Frameworks:	Jupyter Lab and Notebook, RStudio, wxMaxima, Mathematica for scientific programming; VIM (with plugins), Spyder for software developments; Git for version control; GitBook for documentation
System Administration:	personal instance of Nextcloud on a Raspberry Pi server (Raspbian OS), administration and web design of the journal club webpage (`https://torinophd.ddns.net/`) on a Raspberry Pi Apache+PHP+MariaDB installation (GitHub)
Other certifications:	ECDL Core Full (*European Computer Driving Licence*, 04/2012)

Talks and Posters

2021: **Algebraic geometry and computer vision: inception neural network for Calabi-Yau manifolds**
Seminar — *Data, Numbers, and Geometry - DANGER - 2021* (video conference)

Computer Vision and Algebraic Geometry: AI for Theoretical Physics
Poster — *IDAI 2021* (video conference)

Intelligenza Artificiale tra Geometria e Fisica (Artificial Intelligence between Geometry and Physics)
Seminar — *Escuela Alessandro Manzoni*, Buenos Aires, Argentina (video conference)

An AI Perspective on Phenomenology and Strings
Seminar — *Commissariat à l'Energie Atomique et aux énergies alternatives*, Saclay, France (video conference)

2020: **Time Dependent Defect CFT and Excited Spin Fields**
Poster — *Cortona Young* (video conference)

2019: **Spin Fields as Point–like Defects on the Worldsheet**
Poster — *Università Federico II*, Napoli, Italy

Exploring Particle Physics in 2D BCFT: D-branes, Twist Fields and Defect CFT
Talk (Ph.D midterm seminar) — *Università degli Studi di Torino*, Italy

Schools and Workshops

Courses and lectures can be found at the corresponding web page

07/2021: **INRIA-DFKI European Summer School on Artificial Intelligence**
Online event — https://idessai.inria.fr

03/2019: **String Theory from a Worldsheet Perspective**
Firenze, Italy — https://www.ggi.infn.it/showevent.pl?id=289

12/2018: **LACES 2018 – Lezioni Avanzate di Campi e Stringhe**
Firenze, Italy — http://laces.web.cern.ch/laces/LACES18/index18.html

01/2018: **GGI Lectures on the Theory of Fundamental Interactions**
Fireze, Italy — http://webtheory.sns.it/ggilectures2018/

12/2017: **LACES 2017 – Lezioni Avanzate di Campi e Stringhe**
Firenze, Italy — http://laces.web.cern.ch/laces/LACES17/index17.html

Language Skills

Italian: native speaker

English: proficient user — certifications: Cambridge FCE (pass with A), EFCELT at European level C2

French: beginner-intermediate level (can communicate professional results both orally and written)

Personal Interests

- Diploma in musical theory and melodic dictation (*Diploma di Solfeggio e Teoria Musicale*), and diploma in complementary piano studies (*Diploma di Pianoforte Complementare*) for violin
- 10 years experience as basketball player and 2 years experience as basketball coach for youth teams
- Blood donor for the AVIS (*Italian Association of Volunteer Blood Donors*)

Publications

Author profiles:

ArXiv ID:	finotello_r_1
InSpireHEP:	R.Finotello.1
OrcID:	0000-0002-8472-9004
ResearchGate:	Riccardo_Finotello2

List of publications (authors are in **alphabetical order**):

Preprints:

H. Erbin, **R. Finotello**, R. Schneider, M. Tamaazousti, *Deep multi-task mining Calabi-Yau four-folds*, arXiv:2108.02221.

Published:

H. Erbin, **R. Finotello**, *Inception neural network for complete intersection Calabi-Yau 3-folds*, *Mach. Learn. Sci. Tech. 2 (2021) 2, 02LT03*.

H. Erbin, **R. Finotello**, *Machine learning for complete intersection Calabi-Yau: a methodological study*, *Phys. Rev. D 103 (2021) 12, 126014*.

R. Finotello, I. Pesando, *2D fermion on the strip with boundary defects as a CFT with excited spin fields*, *Nucl. Phys. B 969 (2021) 115464*.

A. Arduino, **R. Finotello**, I. Pesando, *On the origin of divergences in time-dependent orbifolds*, *Eur. Phys. J. C 80 (2020) 5, 476*.

R. Finotello, I. Pesando, *The classical solution for the bosonic string in the presence of three D-branes rotated by arbitrary SO(4) elements*, *Nucl. Phys. B 941 (2019), 158–194*.

Personal notes on various subjects (mostly hand written) available at `https://github.com/thesfinox/personal-notes`.