Mariele Motta

Curriculum Vitae

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Education

Apr 2011 – May 2013	**Heidelberg University, Germany** – PhD exchange Main Topics: Modified Gravity, Gauge-Invariant Perturbation Theory, General Scalar Field Lagrangian, Tests of Cosmological Models, Coupled Differential Equations, Numerical Solutions Advisor: Prof. Luca Amendola
Aug 2009 – Aug 2013	**University of Campinas, Brazil** – PhD in Physics Main Topics: Same as above Thesis: *The Dark Universe: Observables and Degeneracies* Advisor: Prof. Pedro Holanda
Aug 2007 – July 2009	**University of Campinas, Brazil** – Master in Physics Main Topics: Dark Matter, Perturbation Theory, Supernovae, Boltzmann code Thesis: *Conversion of Non-Relativistic into Relativistic Dark Matter in Cosmology* Advisor: Prof. Pedro Holanda
March 2003 – July 2007	**University of Campinas, Brazil** – Bachelor in Physics Main Topics: Ising Model, Glauber Model, Ferromagnetism Research Project: *The physics of Stochastic Processes Through the Eyes of an exactly Solvable Model* Advisor: Prof. Guillermo Cabrera

Industry Employment

Oct 2019 – Present	**Machine Learning Research Scientist** – neurocat GmbH – Berlin, Germany Main Projects: - Studied the behavior of the Decision Boundary in Image Classification task during training with clean and adversarial data sets. - Evaluated the effect of training with different loss functions on Adversarial Robustness of Resnets and Parsnets. - Developed White-Box, gradient-based attacks on Automatic Speech Recognition Systems applying constraints for imperceptibility and over-the-air robustness. - Developed Evolutionary Black-Box attacks on Automatic Speech Recognition Systems and Adversarial Defense strategy based on Autoencoder.
Jun 2017 – Oct 2018	**Data Scientist** – smart digital GmbH – Stuttgart, Germany - Developed and applied Machine Learning algorithms to predict website user behavior. - Developed Python code for performing Data Mining and Statistical Analysis.

Academic Employment & Visiting Fellowships

May 2014 – Dec 2016	**Postdoctoral Researcher** – Department of Theoretical Physics, University of Geneva Main Topics: Modified Gravity, Bimetric Gravity, Gauge-Invariant Perturbation Theory, Gravitational Waves, Dynamical Systems, Tests of Cosmological Models, Coupled Differential Equations, Numerical Solutions, Parameter Forecast Principal Investigator: Prof. Ruth Durrer
Jan 2016	**Visiting Fellow** – Institute for Theoretical Physics, Heidelberg University
Oct 2015 – Nov 2015	**Visiting Fellow –** Institute for Theoretical Physics, Heidelberg University
Feb 2014 – Apr 2014	**Visiting Junior Research Fellow** – Department of Astrophysics, University of Oxford
Nov 2013 – Jan 2014	**Visiting Fellow –** Institute for Theoretical Physics, Heidelberg University
Aug 2013 – Oct 2013	**Visiting Fellow –** Department of Theoretical Physics, University of Geneva

Grants and Awards

Sep 2015 – Feb 2016	Subside Tremplin for the Advancement of the Scientific Career - University of Geneva
Jan 2014 – March 2014	Balzan Grant – Oxford New College-Johns Hopkins Centre for Cosmological Studies
April 2012 – Jun 2012	DFG Stipend – Transregional Collaborative Research Centre TRR 33 “The Dark Universe”
Jan 2011 – March 2012	DAAD-CNPq[1] PhD Exchange Program
Aug 2009 – Aug 2013	CNPq PhD Scholarship
Aug 2007 – Jul 2009	CAPES[2] Master Scholarship
Aug 2006 – Jul 2007	CNPq Scientific Initiation Grant

Courses & Certifications

Applied Data Analysis – CS-401, Fall 2016 – École Polytechnique Fédérale de Lausanne (as an auditor)	Solved Exercises: https://github.com/mfmotta/tatoule
Introduction to Deep Learning (Stochastic methods, MLPs, CNNs, RNNs, Autoencoders, Image Generation, Natural Language Processing, Generative Models, GANs.)	National Research University Higher School of Economics - Coursera
Neural Networks and Deep Learning	deeplearning.ai - Coursera
Structuring Machine Learning Projects	deeplearning.ai - Coursera
Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization	deeplearning.ai - Coursera

Machine Learning Projects

A New Loss Function for Image Embeddings from Siamese Networks:
https://github.com/mfmotta/computervision
Studying Generalization Properties of Neural Networks:
https://github.com/mfmotta/generalization

1 - National Council for Scientific and Technological Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico)
2 - Coordination for the Improvement of Higher Education Personnel (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior)

Self-Teaching

Deep Learning Ian Goodfellow, Yoshua Bengio, Aaron Courville	Chapters 1-15
Understanding Machine Learning: From Theory to Algorithms Shai Shalev-Shwartz and Shai Ben-David	Chapters 1-5

Teaching Assistance

Autumn 2016	General Relativity - Master course – University of Geneva
Spring 2016	Electrodynamics II - Undergrad course – University of Geneva
Spring 2015	Electrodynamics II - Undergrad course – University of Geneva
Autumn 2014	General Relativity - Master course – University of Geneva
Spring 2010	Classical Mechanics - Undergrad course – University of Campinas
Autumn 2009	Topics in Astrophysics and Cosmology - Undergrad and Master courses – University of Campinas

Conferences

May 2016	Hot Topics in Modern Cosmology – Cargese, Corsica	Talk
April 2016	Theoretical Cosmology in the Era of Large Surveys – Florence, Italy	Talk
Dec 2015	28th Texas Symposium on Relativistic Astrophysics – Geneva, Switzerland	Talk/Organ.
Oct 2015	Gravity at the Largest Scales – Heidelberg , Germany	Talk
May 2015	Kosmologietag – Bielefeld, Germany	Talk
Feb 2015	Swiss Cosmology Days – Geneva, Switzerland	Talk
Aug 2014	Modern Cosmology: Early Universe, CMB and LSS – Benasque, Spain	
Feb 2014	The Structure of Space and Time – Oxford, United Kingdom	
April 2013	Kosmologietag – Bielefeld, Germany	Talk
March 2013	Cosmological Tests of Gravity – Oxford, United Kingdom	
Dec 2011	5th TR33 Winter School on Cosmology – Paso del Tonale, Italy	
Oct 2011	The Dark Universe Conference – Heidelberg, Germany	
July 2011	International School on Astro-Particle Physics at MPI – Heidelberg, Germany	Poster
July 2010	I Jayme Tiomno School of Cosmology	
Nov 2009	XIV Cicle of Special Courses on Cosmology and Astrophysics – Rio de Janeiro, Brazil	
July 2009	V School of Cosmology and Gravitation - ICRA – Rio de Janeiro, Brazil	
June 2009	VI GEFAN Workshop on Neutrino Physics and Astrophysics – São Paulo , Brazil	Talk
Aug 2008	V GEFAN Workshop on Neutrino Physics and Astrophysics – São Paulo , Brazil	
Sept 2007	XV Internal Congress of Undergraduate Research – Campinas, Brazil	Poster

Publications (scholar.google)

2020 *Understanding the Decision Boundary of Deep Neural Networks: An Empirical Study*
D Mickisch, F Assion, F Greßner, W Günther, M Motta
arXiv preprint arXiv:2002.01810

2017 *Nonstandard gravitational waves imply gravitational slip: On the difficulty of partially hiding new gravitational degrees of freedom*
I Sawicki, ID Saltas, M Motta, L Amendola, M Kunz
Physical Review D 95 (8), 083520

2016 *A general mass term for bigravity*
G Cusin, R Durrer, P Guarato, M Motta
Journal of Cosmology and Astroparticle Physics 2016 (04), 051

2015 *Inflationary perturbations in bimetric gravity*
G Cusin, R Durrer, P Guarato, M Motta
Journal of Cosmology and Astroparticle Physics 2015 (09), 043

2015 *Gravitational waves in bigravity cosmology*
G Cusin, R Durrer, P Guarato, M Motta
Journal of Cosmology and Astroparticle Physics 2015 (05), 030

2014 *New gravitational scales in cosmological surveys*
T Baker, PG Ferreira, CD Leonard, M Motta
Physical Review D 90 (12), 124030

2014 *Stable and unstable cosmological models in bimetric massive gravity*
F Könnig, Y Akrami, L Amendola, M Motta, AR Solomon
Physical Review D 90 (12), 124014

2013 *Probing dark energy through scale dependence*
M Motta, I Sawicki, ID Saltas, L Amendola, M Kunz
Physical Review D 88 (12), 124035

2013 *Limits in late time conversion of cold dark matter into dark radiation*
D Boriero, PC de Holanda, M Motta
Journal of Cosmology and Astroparticle Physics 2013 (06), 006

2013 *Observables and unobservables in dark energy cosmologies*
L Amendola, M Kunz, M Motta, ID Saltas, I Sawicki
Physical Review D 87 (2), 023501

Computer Skills

Python, Keras, TensorFlow
Mathematica
Fortran, C++
Git
SQL, MongoDB
Scrum, JIRA

Languages

Portuguese:	native
English:	fluent
German:	fluent
Spanish:	basic
French:	basic

Berlin, 17.12.2020