Curriculum Vitae

Livia Corsi

June 11, 2019

Personal data.

Place and date of birth: Rome, September 2, 1983

Current position: (since June 2019) RTD-b (TT Assistant Professor) at University of "Roma Tre"

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Education.

1. **October 2005:** University of "Roma Tre": Bachelor degree in Mathematics. Final mark: 110/110 .

2. **May 2008:** University of "Roma Tre": Master degree in Mathematics. Title of the thesis: *"Melnikov theory to all orders and Puiseux series for subharmonic solutions"*. Advisor: Prof. G. Gentile. Final mark: 110/110 *cum laude*.

3. **November 2008 – October 2011:** University of "Roma Tre". PhD in Mathematics. Advisor: Prof. G. Gentile. External examinators: Prof. A. Kupiainen and Prof. M. Berti. Date of defense: January 27, 2012. Title of the thesis: *"Resonant solutions in the presence of degeneracies for quasi-periodically perturbed systems"*.

Qualifications.

Holder of the "Abilitazione Scientifica Nazionale a Professore di II Fascia per il settore 01/A4" ("National Academic Qualification as Associate Professor in Mathematical Physics"), effective from July 13, 2018 to July 13, 2024

Former positions.

1. **May 2012 – November 2013** Postdoc at University of Naples "Federico II" (FORGIARE fellowship)

2. **December 2013 – August 2014** Postdoc at University of Rome "La Sapienza" (within the ERC

project "HamPDEs")

3. **September 2014 – July 2016** Canada Research Chairs Postdoctoral Fellow at McMaster University
4. **August 2016 – July 2018** Visiting Assistant Professor at Georgia Institute of Technology
5. **August 2018 – May 2019** Visiting Assistant Professor at Emory University

Scientific interests.

Dynamical systems, recurrent motions, small divisors problems, resonances, Hamiltonian PDEs

Publications.

1. **L. Corsi, G. Gentile**
   Melnikov theory to all orders and Puiseux series for subharmonic solutions.
   J. Math. Phys. **49** (2008), no.11.
2. **L. Corsi, G. Gentile, M. Procesi**
   KAM theory in configuration space and cancellations in the Lindstedt series.
   Comm. Math. Phys. **302** (2011), no.2, 359–402.
3. **L. Corsi, G. Gentile**
   Oscilator synchronisation under arbitrary quasi-periodic forcing.
   (previously: *Response solutions for arbitrary quasi-periodic perturbations with Bryuno frequency vector*)
   Comm. Math. Phys. **316** (2012), no.2, 489–529.
4. **L. Corsi, R. Feola, G. Gentile**
   Lower-dimensional invariant tori for perturbations of a class of non-convex Hamiltonian functions.
   J. Stat. Phys. **150** (2013), no.1, 156–180
5. **L. Corsi, R. Feola, G. Gentile**
   Domains of analyticity for response solutions in strongly dissipative forced systems.
   J. Math. Phys. **54** (2013), no.12
6. **L. Corsi, R. Feola, G. Gentile**
   Convergent series for quasi-periodically forced strongly dissipative systems.
   Commun. Contemp. Math. **16** (2014), no.3
7. **M. Berti, L. Corsi, M. Procesi**
   An abstract Nash-Moser theorem and quasi-periodic solutions for NLW and NLS on compact Lie groups and homogeneous spaces.
   Comm. Math. Phys. **334** (2015), no.3, 1413–1454.
8. **L. Corsi, G. Gentile**
   Resonant solutions in the presence of degeneracies for quasi-periodically perturbed systems.
   Erg. Th. Dynam. Sys. **35** (2015), no.4, 1079–1140.
9. **L. Corsi, G. Gentile**
   Resonant tori of arbitrary codimension for quasi-periodically forced systems.
   NoDEA, **24** (2017), no.1.
10. **L. Corsi, G. Genovese**

Periodic Driving of an Impurity in the Isotropic XY Chain.
Comm. Math. Phys. **354** (2017), no.3, 1173–1203.

11. **R. Calleja, A. Celletti, L. Corsi, R. de la Llave**
Response solutions for quasi-periodically forced, dissipative wave equations.
SIAM J. Math. Anal., **49** (2017), no.4, 3161–3207

12. **L. Corsi, R. Montalto**
Quasi-periodic solutions for the forced Kirchhoff equation on $\mathbb{T}^d$.
Nonlinearity, **31** (2018), 5075–5109

13. **L. Corsi, R. Feola, M. Procesi**
Finite dimensional invariant KAM tori for tame vector fields.
to appear on *Transactions of the AMS*

Proceedings.

1. **L. Corsi, E. Haus, M. Procesi**
A KAM result on compact Lie groups.
Acta Appl. Math. special issue, SPT - Symmetry and perturbation theory (2014).
Contains original research

Preprint.

1. **L. Corsi, V. Kaloshin**
A locally integrable non-Liouville analytic geodesic flow
preprint, 2018, https://arxiv.org/abs/1803.01222

2. **D. Borthwick, L. Corsi, K. Jones**
Sharp diameter bound for the Spectral Gap for Quantum Graphs
preprint, 2019, https://arxiv.org/abs/1905.03071

Short visits.

1. **November 2010**. Mathematics department, University of Naples "Federico II"
2. **October 2012**: Mathematics department, University of Milan
3. **March 2013**: School of Mathematics, Georgia Institute of Thecnology
4. **February 2014**: Mathematics department, University of Padua
5. **May 2014**: SISSA - International School for Advanced Studies, Trieste
6. **June 2014**: Mathematics department, University of Milan
7. **December 2014**: Mathematics department, University of Milan
8. **December 2014**: Institute of Mathematics, University of Zurich
9. **June 2015**: Mathematics department, Sapienza, University of Rome
10. **December 2015**: Mathematics and Physics department, University of "Roma Tre"
11. **February 2015**: Mathematics and Physics department, University of "Roma Tre"
12. **April 2016**: Department of Mathematics, University of Maryland
13. **September 2016**: Mathematics and Physics department, University of "Roma Tre"
14. **December 2016–January 2017**: Mathematics and Physics department, University of "Roma Tre"
15. **April 2017**: Department of Mathematics and Statistics, University of Southern Alabama

15. **June 2017**: Institute of Mathematics, University of Zurich
16. **November 2017**: Institute of Mathematics, University of Zurich
17. **November 2017**: Departemento de Matemàticas y Mecànica, UNAM
18. **April 2018**: CIMAT - Centro de Investigación en Matemàticas, Guanajuato
19. **April 2018**: Departemento Académico de Matemàticas, ITAM
20. **May 2018**: Mathematics and Physics department, University of "Roma Tre"
21. **June 2018**: SISSA - International School for Advanced Studies, Trieste

Schools and workshops - Invited speaker:

1. **June 2012**. "Hamiltonian PDEs"
   Capri, 4 – 7 June 2012
   Talk: *Resonant motions in the presence of degeneracies for quasi-periodically perturbed systems.*

2. **July 2013**. "Planetary motion, satellite dynamics and Spaceship Orbits"
   Montréal, 20 – 27 July 2013
   Talk: *Degenerate lower-dimensional invariant tori for non-convex Hamiltonian systems*

3. **September 2013**. "Multiscale analysis and small divisors"
   Maiori, 16 – 20 Semptember 2013
   Talk: *An abstract implicit function theorem*

4. **August 2014**. "Summer School on Dynamical Systems"
   Washington DC, 17 – 25 August 2014
   Talk: *Resonant tori of arbitrary codimension for quasi-periodically forced systems*

5. **December 2014**. "KAM and dispersive methods in Hamiltonian PDEs"
   Milan, 1 – 5 December 2014
   Talk: *Degenerate resonant tori*

6. **September 2016**. "Hamiltonian Dynamics, PDEs and Waves on the Amalfi coast"
   Maiori, 5 – 10 September 2016
   Talk: *Locally integrable non-Liouville analytic geodesic flows on* $\mathbb{T}^2$

7. **July 2017**. "Mathematical Congress of the Americas"
   Montréal, 24 – 28 July 2017
   Talk: *Periodic Driving of an Impurity in the Isotropic XY Chain*

8. **January 2018**. "Introduction to Dynamical Systems Methods for Space Mission Design"
   Atlanta, 16 – 19 January 2018
   Talk: *Lindstedt series - Everything you always wanted to know about them (but were afraid to ask)*

Schools and workshops - Posters and contributed talks:

1. **May 2011**. "Conference on KAM and Cauchy theory for PDEs"
   Ravello, 23 – 27 May 2011
   Poster: *Response solutions for arbitrary quasi-periodic perturbations with Bryuno frequency vector.*

2. **May 2014**. "SPT - Symmetry and perturbation theory"
   Cala Gonone, 26 – 31 May 2014
   Talk: *An abstract Implicit Function Theorem and quasi-periodic solutions for Hamiltonian PDEs on*

homogeneous manifolds

3. **June 2014**. "Jornades d'interacciò entre sistemes Dinàmics i EDPs (JISD2014)"
   Barcelona, 16 – 20 June 2014
   Talk: *Resonant tori of arbitrary codimension for quasi-periodically forced systems*

4. **June 2015**. "Hamiltonian systems and their applications"
   St. Petersburg, 3 – 8 June 2015
   Talk: *An abstract KAM result*

5. **June 2016**. "Analysis of Partial Differential Equations using Dynamical Systems Techniques"
   Boston, 1 – 3 June 2016
   Talk: *Blossoming resonant tori: mind the gaps*

6. **June 2017**. "Llavefest: A broad perspective on finite and infinite dimensional dynamical systems"
   Barcelona, 12 – 16 June 2017
   Talk: *Quasi-periodic solutions in forced systems*

7. **October 2017**. "SEARCDE 2017"
   Kennesaw, 7 – 8 October 2017
   Talk: *Quasi-periodic solutions for dispersive PDEs*

Teaching:

From 2018 to 2019: Instructor for the courses "Calculus 1", "Calculus 2" and "Ordinary Differential Equations" at the Department of Mathematics, Emory University.

From 2016 to 2018: Instructor for the courses "Calculus 1", "Introduction to Linear Algebra", "Linear Algebra" and "Ordinary Differential Equations" at the School of Mathematics, Georgia Institute of Technology.
Coordinator of the Undergraduate Research Course "Analytical Mechanics" at the School of Mathematics, Georgia Institute of Technology, during Summer 2018.

From 2014 to 2016: Instructor for the courses "Engineering Mathematics III - ODEs" and "Engineering Mathematics IV - vector calculus and linear PDEs" at the Department of Mathematics and Statistics, McMaster University

From 2012 to 2014: Teaching assistant for the course "Dynamical systems" (Prof. V. Coti Zelati), at the Mathematics department, University of Naples "Federico II".

From 2008 to 2012: Teaching assistant for the courses "FM1 - Dynamical systems" (Prof. G. Gentile) and "FM2 - Linear PDEs" (Prof. A. Pellegrinotti), at the Mathematics department, University of "Roma Tre".

From 2004 to 2008: Tutor for the courses "FM1 - Dynamical systems" (Prof. G. Gentile), "GE2 - Euclidean, affine and projective geometry" (Prof. A. Verra) and "GE4 - Curves and surfaces in the euclidean space" (Prof. M. Pontecorvo) at the Mathematics department, University of "Roma Tre".

Students mentored

1. Roberto Feola (Master and PhD) - now postdoc at SISSA, Trieste
2. Giuseppe Genovese (PhD) - now postdoc at University of Zurich
3. Bobby Wilson (PhD) - now postdoc at MIT

4. Nikolay Hristov (Master) - now PhD student at McMaster University
5. Alice Ambrosio (PhD) - now Data Analyst at SaltGrid
6. Christian Ozburn (Undergraduate)
7. George Duncan (Undergraduate)

Organization of conferences.

1. Multiscale methods in Small Divisor problems
   (together with A. Ambrosio, M. Berti, P. Baldi, P. Bolle, V. Coti Zelati, M. Procesi)
   http://www1.mat.uniroma1.it/people/mprocesi/maiori.html
   Maiori, 16–20 September 2013

2. Roman Summer School and Workshop: KAM Theory and Dispersive PDEs
   (together with P. d'Ancona, M. Berti, L. Biasco, L. Fanelli, R. Feola, E. Haus, P. Magrone, C. Procesi, M. Procesi)
   http://www1.mat.uniroma1.it/people/mprocesi/RomanPDEs2014.html
   Rome, 1–11 September 2014

3. Introduction to Dynamical Systems Methods for Space Mission Design
   (together with R. Anderson, M. Gidea and R. de la Llave)
   http://people.math.gatech.edu/∼rll6/JPL/jpl.html
   Atlanta, 16–19 January 2018

Research programs.

1. Participant to the program *Sistemi dinamici, equazioni alle derivate parziali e meccanica statistica*, PRIN announcement 2008 (scientific coordinator: Giovanni Gallavotti).

2. Participant to the ERC project *Hamiltonian PDEs and small divisor problems: a dynamical systems approach*, under FP7 (principal investigator: Michela Procesi)

3. Participant to the project *Invariant objects in dynamical systems: Analysis and numerics*, NSF grant DMS-1500943 (principal investigator: Rafael de la Llave)