

Curriculum Vitae

by Simona Settepanella
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Education:

- Ph.D. in Computer Science at Teramo University, December 2007;
- Ph.D. in Mathematics at Pisa University, November 2003;
- Degree in Mathematics at Perugia University, December 1997. Full marks *cum laude*.

Current Position:

Assistant Professor (rtd-B) (2021 - present) Department of Economics and Statistics, Torino University, Italy.

Previous Positions:

- Associate Professor (2016 - 2021) Mathematics Department, Hokkaido University, Japan.
- Specially Appointed Lecturer (2013 - 2016) Mathematics Department, Hokkaido University, Japan.
- Research Fellow (2008 - 2013) Scuola Sant'Anna di Studi Avanzati, Pisa, Italy.
- Teacher (2007 - 2008) High School IPSIA, Pontedera, Pisa, Italy.
- Employee of Italian Government with a salary for study and research (2004 - 2007) as Ph.d. at Communication Sciences Department, Teramo University, Italy.
- Post doc fellow (2004) M.S.R.I, Berkeley, CA, USA.
- Post doc fellow (2003 - 2004) Mathematics Department, Pisa University, Italy.

Recent Visiting Positions:

- February - May 2020, LUISS, Roma (Italy) ;
- June - September 2019, Scuola Sant'Anna di Studi Avanzati, Pisa (Italy);
- March 2019, research in pairs at MFO, Oberwolfach (Germany);

- September 2018, Centro De Giorgi, Pisa (Italy);
- May - June 2017, Scuola Sant'Anna di Studi Avanzati, Pisa (Italy);
- September 2016, Centro De Giorgi, Pisa (Italy);
- February 2015, Centro De Giorgi, Pisa (Italy);
- September 2014, Max Plank Institute, Bonn (Germany);

Other:

- Representative¹ of Italian Researchers in Japan in occasion of the visit in Tokyo of Under-Secretary of State of the Italian Ministry of Economic Development, Michele Geraci (December 2019).
- Representative of women in mathematics in the Women of Mathematics: A Gallery of Portraits during the inauguration of the exhibition at the Delegation of the European Union in Tokyo, Japan (October 2019).
- Representative of International Faculties at Hokkaido University in occasion of the visit of representatives of the MEXT, Ministry of Education, Culture, Sports, Science and Technology, at Hokkaido University (January 2018)
- Italian ambassador for women in STEM (December 2016);
- Italian Qualification as Associate Professor for the Sector 01/A2 - Geometria e Algebra (December 2013);
- Affiliation at the Institute of Economics of Scuola Superiore Sant'Anna (2013-present);

Refereeing Activity :

Economics Journal of Economic Interaction and Coordination; Advances in Applied Mathematics; Journal of Evolutionary Economics; Evolutionary and Institutional Economics Review;
Mathematics CRM Series - Pubblicazioni del Centro di ricerca matematica Ennio De Giorgi; Journal of Algebraic Combinatorics (JACO); European Journal of Combinatorics.

Editor Activity :

Special editor for Evolutionary and Institutional Economics Review.
 Guest editor of the Volume 12 Issue I (2015) Evolutionary and Institutional Economics Review.

Committee member :

Admission exam of Allievi at Scuola Superiore Sant'Anna in Pisa (Italy) in years 2013/14, 2014/15 and 2015/16.

Last 6 years seminars and invited talks at conferences and workshops:

- *The intersection lattice of Discriminantal Arrangement*, invited seminar at Pisa University PISA, (ITALY) (April 2020)²;
- *Production Theory: a new geometrical model to assess productivity in presence of heterogenous firms*, invited seminar at Scuola Sant'Anna PISA, (ITALY) (April 2020);
- *Production Theory: a new geometrical model to assess productivity in presence of heterogenous firms*, invited seminar at La Sapienza University ROME, (ITALY) (March 2020);

¹I have been asked to give a speech as representative of Italian Researchers in Japan

²All the seminars in 2020 have been suspended due to COVID pandemic.

- *Production Theory: a new geometrical model to assess productivity in presence of heterogenous firms*, series of lectures at LUISS ROME, (ITALY) (March 2020);
- *Discriminantal Arrangement: a combinatorics way to encode special geometric configurations*, invited seminar at Parma University PARMA, (ITALY) (September 2019);
- *Production Theory: a new geometrical model to assess productivity*, invited seminar at LUISS ROME, (ITALY) (September 2019);
- *Production Theory: a new geometrical model to assess productivity*, invited seminar at Torino University TORINO, (ITALY) (July 2019);
- *Multi-factor Productivity and Evolutionary Accounting in Presence of (Persistently) Heterogeneous Firms*, invited seminar, Economics Department, Tokyo University TOKYO, (JAPAN) (December 2018);
- *Multi-Factor Productivity and Evolutionary Accounting in Presence of (Persistently) Heterogeneous Firms*, Innovation, Catch-up and sustainable development, ISS Conference, SEOUL, (KOREA) (July 2018);
- *Judgement aggregation and social choice: a graph model*, Mathematical Analysis of Self-Organization with Constraints, RIMS Symposium KYOTO, (JAPAN) (May 2018);
- *Discriminantal arrangement, hypersurfaces in Grassmannian and Pappus's Theorem.*, Women in Mathematics - a Panorama of Contributions, SAPPORO, (JAPAN) (July 2017);
- *Intersection lattice of Discriminantal arrangement and hypersurfaces in Grassmannian*, Arrangements and beyond: Combinatorics, geometry, topology and applications, Centro De Giorgi PISA, (ITALY) (June 2017);
- *Intersection lattice of Discriminantal arrangement and hypersurfaces in Grassmannian*, invited seminar at Mathematics Department of Copenhagen University, COPENHAGEN, (DENMARK) (May 2017);
- *Homology graph of real arrangements and monodromy of Milnor Fiber*, Hyperplane Arrangements and related topics, SAPPORO, (JAPAN) (February 2017);
- *Discrete Morse Theory and minimal CW-complex*, Towards a New Paradim for Self-Organizaition with constrains, SAPPORO, (JAPAN) (November 2016);
- *Strata of Discriminantal Arrangements*, Special Session on Combinatorics, at the Crossroads of Algebra, Geometry, and Topology, AMS Meeting BRUNSWICK, ME, (USA), (September 2016);
- *Discrete Morse Theory and minimal CW-complex*, Perspectives on arrangements and configuration spaces, Centro De Giorgi PISA, (ITALY) (September 2016);
- *Arrow's impossibility theorem on existence of global optimum and local alternatives: local optima*, Towards a New Paradim for Self-Organizaition, RIMS Symposium KYOTO, (JAPAN) (May 2016);
- *Strata of Discriminantal Arrangements*, Arrangements: topology,combinatorics and stability, Centro De Giorgi PISA, (ITALY) (February 2016);
- *Arrangements of hyperplanes and decision theory* , Towards a New Paradim for Self-Organizaition, RIMS Symposium KYOTO, (JAPAN) (May 2015);
- *The nbc-minimal complex of supersolvable arrangements*, Arrangements of plane curves and related problems TOKYO, (JAPAN) (March 2015);

- *Zonotopes and Production Theory*, invited seminar at Mathematics Department, Verona University (ITALY) (March 2015);
- *The nbc-minimal complex of supersolvable arrangements*, Algebraic topology, geometric and combinatorial group theory, Centro De Giorgi PISA, (ITALY) (February 2015);
- *Geometric methods in Economics* , Seminar at Chuo University TOKYO, (JAPAN) (December 2014);
- *Zonotopes and Production Theory*, Seminar at Bremen University BREMEN, (GERMANY) (February 2014);
- *Braid groups in complex spaces and grassmannians* , Women in algebraic Topology, MSRI BERKELEY, (USA) (January 2014);
- *Geometric methods in Economics*, Seminar at Berkeley University BERKELEY, (USA) (January 2014).

List of publications

Published articles

Algebra and Geometry

1. *The \mathbf{nb} minimal complex of supersolvable arrangements* (with M. Torielli) accepted on Australasian Journal of Combinatorics.
2. *Pappus's Variety in Grassmannian $Gr(3, n)$* (with S. Sawada and S. Yamagata), *Ars Mathematica Contemporanea*, **16** (2019) 257-276.
3. *Strata of Discriminantal Arrangements* (with A. Libgober), *Journal of singularities*, volume in honor of E. Brieskorn **18** (2018) 441-456.
4. *Discriminantal Arrangement, 3×3 Minors of Plücker Matrix and hypersurfaces in Grassmannian $Gr(3, n)$* (with S. Sawada and S. Yamagata), *C. R. Acad. Sci. Paris, Ser. I* **355** (2017), 1111-1120.
5. *Homology graph of real arrangements and monodromy of Milnor Fiber* (with P. Baillet), *Advances in Applied Mathematics* **90** (2017), 46-85.
6. *On the Configuration Spaces of Grassmannian Manifolds* (with S.Manfredini), *Annales de la Faculté des Sciences de Toulouse* , **23** (2014), issue 2, 353-359.
7. *Braid groups in complex spaces* (with S.Manfredini and S. Parveen), *Bollettino dell'Unione Matematica Italiana* **7** (2014), issue 2, 157-168.
8. *Braid groups in complex Grassmannians* (with S.Manfredini), *Topology and its Applications* **176** (2014), 51-56 .
9. *Vanishing results for the cohomology of complex toric hyperplane complements* (with M. Davis), *Publicacions Matemàtiques* **57** (2013), issue 2, 379-392.
10. *The homotopy type of toric arrangements* (with L. Moci), *Journal of Pure and Applied Algebra* **215** (2011), pp. 1980-1989.
11. *Combinatorial polar ordering and recursively orderable arrangements* (with E. Delucchi), *Advances in Applied Mathematics* **44** (2010), issue 2, 124-144.
12. *Blocking Sets in the complement of hyperplane arrangements in projective space*, *Journal of Discrete Mathematical Sciences & Cryptography* **12** (2009), 101-107.
13. *Cohomology of Pure Braid Groups of exceptional cases*, *Topology and its Applications* **156** (2009), 1008-1012.
14. *On the Cohomology with local coefficients of Pure Braid Groups*, *Analele stiintifice ale Universitatii Ovidius Constanta, Seria Matematica* **17**(1) (2009), 211-230.

15. *Combinatorial Morse theory and minimality of hyperplane arrangements* (with M. Salvetti), *Geometry & Topology* **11** (2007) 1733-1766.
16. *A stability-like theorem for cohomology of Pure Braid Groups of the series A, B and D*, *Topology and its Applications* **139** (2004), no.1-3, 37-47.

Economics and decision theory papers

17. *Towards a Unified Aggregation Framework for Preferences and Judgements* (with L. Marengo and Y. Zhang), to appear in *Evolutionary and Institutional Economics Review*.
18. *Productivity Decomposition in Heterogeneous Industries* (with G. Dosi, M. Grazzi, L. Li, L. Marengo), to appear in *Journal of Industrial Economics*.
19. *Production theory: accounting for firm heterogeneity and technical change* (with G. Dosi, M. Grazzi and L. Marengo), *Journal of Industrial Economics* **64** (2016) 875-907.
20. *A discrete geometric approach to heterogeneity and production theory* (with G. Dosi, M. Grazzi, L. Marengo, F. Ponchio), *Evolutionary and Institutional Economics Review* **12** (2015) 223-234.
21. *Decidability in complex social choice* (with G. Amendola, L. Marengo, D.Pirino and A. Take-mura), *Evolutionary and Institutional Economics Review* **12** (2015) 141-168 .
22. *Social Choice among Complex Objects* (with L. Marengo), *Annali della Scuola Normale Superiore di Pisa - Classe di Scienze* **13** (2014), issue 5, 1-26.
23. *Modularity and Optimality in Social Choice* (with G.Amendola), *The Journal of Mathematical Sociology* **36** (2012), issue 1, pp. 44-77.

Preprints under review:

Economics and decision theory papers

24. *The Robustness of the Generalized Gini Index* (with M. Franciosi and A. Terni) arXiv (sub-mitted)
- 25 *The Deviation Terms in the Decomposition of Aggregate Productivity Growth* (with Li L.) (submitted)
- 26 *Divide and Conquer: The engineering of delegation* (with G. Amendola, L. Marengo and C. Minto) (submitted)

Theses:

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|-------------|--|-------------------------------------|
| Ph.D Thesis | <i>Blocking Sets in the complement of hyperplane ar-rangements in projective space</i> | supervisor Prof. F. Eugeni (2007) |
| Ph.D Thesis | <i>Cohomologies of Generalized Pure Braid Groups and Milnor fibre of reflection arrangements</i> | supervisor Prof. M. Salvetti (2003) |

Teaching Expertise

Teaching experience

At Ph.D Level:

<i>Year</i>	<i>Course</i>	<i>Institution</i>
2018	Discrete Morse Theory and its application	Intensive course at Centro De Giorgi
2008 - 2013	Linear Algebra (in English)	International Ph.D. in Economics at Scuola Sant'Anna

At Master Level:

<i>Year</i>	<i>Course</i>
2020	Overview on Modern Mathematics
2019	Lie Group and Lie Algebra
2019	Reflections Groups and Coxeter Groups
2018	Lie Algebra and Lie Groups
2017	Representation Theory, a first course
2016	Homology and Cohomology Theory
2008 - 2013	Linear Algebra for Allievi of Scuola Sant'Anna

At undergraduate level:

<i>Year</i>	<i>Course</i>	<i>Degree Course</i>
2013 - 2019	Calculus I and II	First year students (general)
2013 - 2016	Linear Algebra I and II	First year students (general)

As teaching assistant at Pisa University:

From 2000 to 2006 she has been teaching assistant in courses of general mathematics for Computer Scientists and Biologists.

Students¹

Post doc: Le Li*

Ph.D students: So Yamagata and Pragnya Das

Master students: Shunsuke Mitsui*, Takuya Saito, Camden Hine

Graduated students: Yoshiki Nakajima* , Sumire Sawada, Motoki Oiyama, Connor Minto*, Alessandro Terni*

¹Students marked with (*) graduated or are working on a subject related to mathematics applied to economics.

Administrative and management expertise

Internationalization Committee

In the last five years the applicant has been part of the Internationalization Committee of the Mathematics Department of Hokkaido University. The applicant, as part of this Internationalization Committee, applied and won as co-applicant:

- Top Collaboration Project (December 2014 - March 2015);
- Top Collaboration Project A: Advanced (May 2015 - March 2016);
- Learning Satellite¹ (September 2015 - March 2017);
- Hokkaido Summer Institute(July - August 2017) ;
- Learning Satellite² (February 2018 - March 2019).
- Learning Satellite³ (April 2020 - March 2021).

The applicant administrated the grants of the first three projects. Money have been used to organize the following schools ⁴.

Organized Schools

1. SPRING SCHOOL at Hokkaido University (co-organizers Masahiko Yoshinaga and Hideo Kubo), March 2015;
2. SUMMER SCHOOL at Hokkaido University (co-organizers Masahiko Yoshinaga and Hideo Kubo), July - August 2015;
3. AUTUMN SCHOOL at Hokkaido University (co-organizer Hideo Kubo), November- December 2015 ;
4. SUMMER SCHOOL⁵ at Centro De Giorgi in Pisa (co-organizers G. Gaiffi, V. Georgiev, T. Pacini and M. Torielli), August - September 2016.
5. SUMMER SCHOOL at Centro De Giorgi in Pisa (co-organizers G. Gaiffi, S. Galatolo, D. Lombardo and A. Sorrentino), August - September 2018.
6. SUMMER SCHOOL at Centro De Giorgi in Pisa (Scientific committee L. Arosio, P. Boito, G. Gaiffi, S. Galatolo, M. Ghimenti, J. Masamune, R. Molle and S.Settepanella), August - September 2020 (suspended due to COVID pandemic and postponed to 2021).

In particular the 2106 Summer School in Pisa also included 4 Workshops supervised by the applicant.

Organized Workshops and Conferences

5. WORKSHOP *Advances in Hyperplane Arrangements* (co-organizers P. Bailet, E. Feitchner, M. Yoshinaga), Bremen, Germany, August 2017. <http://www.alta.uni-bremen.de/AHA17/>

¹2 years grant of around 1.5 million yen (around 12500 euro) for each year

²1 years grant of around 1.2 million yen (around 10000 euro)

³2 years grant of around 1.2 million yen per year

⁴More detailed informations can be found at https://www.math.sci.hokudai.ac.jp/~gpph/index_en.html

⁵13 graduate students of Hokkaido University had full expenses covered to attend the School. Moreover this summer school is recognized as one of the "150th Annivarsary of Relationships between Japan and Italy" event.

6. WORKSHOP *Women in Mathematics - a Panorama of Contributions* (co-organizers E. Feitchner, E. Palezzato, M. Yuri), Sapporo, Japan, July 2017 . <http://www.math.sci.hokudai.ac.jp/~s.settepanella/WomeninMathematics-aPanoramaofContributions/index.html>
7. WORKSHOP *Hyperplane Arrangements and related topics* (co-organizers T. Abe, T. Ohomoto, M. Torielli, M. Yoshinaga), Sapporo, Japan, February 2017. <http://www.math.sci.hokudai.ac.jp/~yoshinaga/research/conference/conf201702Terao.html>
8. CONFERENCE *Hyperplane Arrangements* (co-organizers T. Abe, H. Terao, M. Yoshinaga and M. Wakefield); Hokkaido University, Sapporo, Japan, August 2016. <http://www.math.sci.hokudai.ac.jp/~scha/>
9. MINISYMPOSIUM of SIAM Conference, (co-organizers E. Feitchner and Y. Aruka); Daejeon, South Korea, August 2015. <https://camp.nims.re.kr/activities/eventpages/?id=200&action=overview>
10. WORKSHOP on *Arrangement of Hyperplanes* (co-organizer E. Feitchner); Bremen University, Germany, December 2014. <http://www.alta.uni-bremen.de/JSAH/>
11. WORKSHOP on *Recent Developments on Geometric and Algebraic methods in Economics* (co-organizers H. Terao, M. Nishibe and M. Yoshinaga); Hokkaido University, Japan, August 2014 . <http://www.math.sci.hokudai.ac.jp/~mathecon/index.html>

Agreements and Double Degree Program

During her stay at Hokkaido University, as part of the International Committee, the applicant worked to sign:

Agreements of Exchange of Students with

- Mathematics Department of Pisa University, Pisa, Italy;
- Class of Science of Scuola Normale, Pisa, Italy;
- Class of Social Science of Scuola Superiore Sant'Anna, Pisa, Italy;
- Mathematics Department of Roma Tor Vergata, Roma, Italy.

Double Degree Program with

- Mathematics Department of Pisa University, Pisa, Italy (accomplished);
- Mathematics Department of Roma Tor Vergata University, Rome, Italy (currently undergoing).

Grants

Recent Research Grants.

- April 2021, 3 years JSPS Kakenhi grant as principal applicant. Title: “Algebraic structures of Manin and Schechtman higher braid groups and stratifications of discriminantal arrangements”, amount 5 million yen (around 43.000 euro).
- April 2017, donation for research by private Entities of 2.8 million yen (around 23.000 euro).
- April 2016, 3 years JSPS Kakenhi grant as principal applicant. Title: “On generalized pure braid group”, amount 4.4 million yen (around 37.000 euro).
- April 2016, 3 years JSPS Kakenhi as co-applicant. Total amount applied 20 million (around 170.000 euro) (as co-applicant she personally got 250 thousand yen per year)
- Year 2014, 2 years JSPS grant Sakura Project (joint French-Japanese project) as co-applicant. Total amount 2 million yen.
- August 2013, 3 years research funds awarded by Hokkaido University. Amount 3.3 million yen (around 27.000 euro)

Other recent Grants.

In all the following grants I participated as co-applicant. They all range between 1.5 and 2 million yen (around 13.000 and 17.000 euro) per year and are awarded by Hokkaido University.

- Year 2019, 2 years grant Learning Satellite Program.
- Year 2018, 1 years grant Learning Satellite Program.
- Year 2016, 1 year grant Summer Institute Program.
- Year 2016, 1 year grant of President of Hokkaido University.
- Year 2015, 2 years grant Learning Satellite Program.
- Year 2015, 1 year grant Summer Institute Program.
- Year 2014, 1 year grant Summer Institute Program.