# CURRICULUM VITAE

# VALENTINA CAMMAROTA

Current position	Associate Professor, Sapienza University of Rome. Starting from March 20 2020.
Office	P.le Aldo Moro 5 - Dipartimento di Scienze Statistiche, 4th floor, office number 7.
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Web Site	http://sites.google.com/site/valentinacammarota/

## **PUBLICATIONS**

## SUBMITTED

- V. Cammarota, D. Marinucci, M. Rossi. "Lipschitz-Killing Curvatures for Arithmetic Random Waves". https://arxiv.org/abs/2010.14165
- V. Cammarota and D. Marinucci. "On the Correlation of Critical Points and Angular Trispectrum for Random Spherical Harmonics". Submitted. https://arxiv.org/abs/1907.05810

### PUBLICATIONS IN PEER-REVIEWED JOURNALS

- 1. V. Cammarota, D. Marinucci, I. Wignam. "Nodal deficiency of random spherical harmonics in presence of boundary". Accepted for publication in *Journal of Mathematical Physics*. https://arxiv.org/pdf/2011.01571.pdf
- 2. D. Beliaev, V. Cammarota, I. Wigman. "No repulsion between critical points for planar Gaussian random fields". *Electronic Communications in Probability*, volume 25, paper no. 82 (2020). https://projecteuclid.org/euclid.ecp/1607742511, https://arxiv.org/abs/1911.03455

- 3. V. Cammarota, O. Klurman, I. Wignam. "Boundary effect on the nodal length for Arithmetic Random Waves, and spectral semi-correlations". *Communications in Mathematical Physics*, 376(2), 1261-1310, (2020). https://doi.org/10.1007/s00220-020-03737-w, https://arxiv.org/abs/1903.10602
- 4. Y. Fantaye, V. Cammarota, D. Marinucci, A. P. Todino. "A Numerical Investigation on the High-Frequency Geometry of Spherical Random Eigenfunctions". *High Frequency*, Volume 2, Issue 3-4, June-August 2019. https://arxiv.org/abs/1902.06999
- 5. V. Cammarota and D. Marinucci. "A reduction principle for the critical values of random spherical harmonics". *Stochastic Processes and their Applications*, Volume **130**, Issue 4, April 2020, Pages 2433-2470. https://arxiv.org/abs/1806.00245
- 6. V. Cammarota. "Nodal area distribution for arithmetic random waves". Transactions of the American Mathematical Society, 372 (2019), 3539-3564. https://arxiv.org/abs/1708.07679
- 7. D. Cheng, V. Cammarota, Y. Fantaye, D. Marinucci and A. Schwartzman. "Multiple testing of local maxima for detection of peaks on the (celestial) sphere". *Bernoulli*, **26**, Number 1 (2020), 31-60. http://arxiv.org/pdf/1602.08296v2.pdf
- 8. V. Cammarota and D. Marinucci. "A quantitative Central Limit Theorem for the Euler-Poincaré characteristic of random spherical eigenfunctions". *Annals of Probability*, **46**, Number 6 (November 2018), 3188-3228. http://arxiv.org/pdf/1603.09588.pdf
- 9. D. Beliaev, V. Cammarota, I. Wigman. "Two Point Function for Critical Points of a Random Plane Wave". *International Mathematics Research Notices*, Volume 2019, Issue 9, 7 May 2019, 2661-2689. https://doi.org/10.1093/imrn/rnx197. https://arxiv.org/abs/1704.04943
- 10. V. Cammarota and I. Wigman. "Fluctuations of the total number of critical points of random spherical harmonics". Stochastic Processes and their Applications, 127, issue 12, 3825-3869 (2017) http://arxiv.org/abs/1510.00339.pdf
- 11. V. Cammarota, D. Marinucci and I. Wigman. "Fluctuations of the Euler-Poincaré characteristic for random spherical harmonics". *Proceedings of the American Mathematical Society*, **144**, issue 11, 4759-4775 (2016) http://arxiv.org/abs/1504.01868.pdf
- 12. V. Cammarota, D. Marinucci and I. Wigman. "On the distribution of the critical values of random spherical harmonics". *The Journal of Geometric Analysis*, **26** (2016) http://arxiv.org/abs/1409.1364.pdf
- V. Cammarota and A. Lachal. "Entrance and sojourn times for Markov Chains. Application to (L, R)-random walks". Markov Processes and Related Fields, 21, issue 4, 887-938 (2015) http://arxiv.org/abs/1503.08632.pdf
- 14. V. Cammarota and D. Marinucci. "The Stochastic Properties of ℓ¹-Regularized Spherical Gaussian Fields". Applied and Computational Harmonic Analysis, 38, issue 2, 262–283 (2015) http://arxiv.org/abs/1309.3459.pdf
- 15. V. Cammarota and D. Marinucci. "On the Limiting Behaviour of Needlets Polyspectra". *Annales de l'Institut Henri Poincaré (B) Probabilitès et Statistiques*, **51**, issue 3, 1159-1189 (2015) http://arxiv.org/abs/1307.4691.pdf
- 16. V. Cammarota, A. De Gregorio and C. Macci. "On the asymptotic behavior of the hyperbolic Brownian motion". J. Stat. Phys., 154, 1550–1560 (2014) http://arxiv.org/abs/1303.4176.pdf

- 17. S. M. Feeney, D. Marinucci, J. D. McEwen, H. V. Peiris, B. D. Wandelt and V. Cammarota. "Sparse Inpainting and Isotropy". *J. Cosmol. Astropart. Phys.*, 1 (2014) http://arxiv.org/abs/1308.0602.pdf
- 18. V. Cammarota and P. Mörters. "On the most visited sites of planar Brownian motion". *Electron. Commun. Probab.*, 17 no. 15, 1–9 (2012) http://arxiv.org/abs/1202.1847.pdf
- 19. V. Cammarota and E. Orsingher. "Hitting spheres on hyperbolic spaces". *Theor. Probability Appl.* **57**, no 3, 560–587 (2012) http://arxiv.org/abs/1104.1043.pdf
- 20. V. Cammarota and A. Lachal. "Joint distribution of the process and its sojourn time in a half-line  $[a, +\infty)$  for pseudo-processes driven by a high-order heat-type equation". Stochastic Process. Appl., 122, 217–249 (2012)
- 21. V. Cammarota and A. Lachal. "Joint distribution of the process and its sojourn time on the positive half-line for pseudo-processes governed by high-order heat equation". *Electron. J. Probab.*, 15, 895–931 (2010) http://arxiv.org/abs/1001.4201.pdf
- 22. V. Cammarota and E. Orsingher. "Angular processes related to Cauchy random walks". *Theor. Probability Appl.*, **55**, no 3, 489–506 (2010) http://arxiv.org/abs/1107.4910.pdf
- 23. V. Cammarota, A. Lachal and E. Orsingher. "Some Darling-Siegert relationships connected with random flights". Stat. Prob. Lett., 79, no. 2, 243-254 (2009) http://arxiv.org/abs/0911.5519.pdf
- 24. V. Cammarota and E. Orsingher. "Cascades of Particles Moving at Finite Velocity in Hyperbolic Spaces". J. Stat. Phys., 133, 1137–1159 (2008) http://arxiv.org/abs/1107.4904.pdf
- 25. V. Cammarota and E. Orsingher. "Travelling randomly on the Poincaré half-plane with a Pythagorean compass". J. Stat. Phys., 130, 455–482 (2008) http://arxiv.org/abs/1107.4914.pdf

ACADEMIC EMPLOYMENT

2020 - now	Associate Professor. Sapienza University of Rome. Starting from March 20 2020.
2017 - 2020	Ricercatore Tipo B. Sapienza University of Rome. March 20 2017 - March 19 2020.
2016 - 2017	Abilitazione Scientifica Nazionale Settore Concorsuale 01/A3, Analisi Matematica, Probabilità e Statistica Matematica - II Fascia - Quarto Quadrimestre, tornata 2018 (dal $3/04/2018$ al $3/04/2024$ ).
2016 - 2017	Research Associate in Probability Theory/Mathematical Physics. Department of Mathematics, King's College London. Research project: <i>Nodal Lines</i> , ERC Grant agreement n. 335141, P.I. Dr. Igor Wigman. June 1 2016 - March 14 2017.
2015	Qualification a Maître de Conférences. Number of Qualification 15225275827. February 11 2015.
2012 - 2016	Postdoc in Probability. Department of Mathematics, University of Rome 'Tor Vergata'. Research project: <i>Probabilistic and Statistical Techniques for Cosmological Applications</i> , ERC Grant agreement n. 277742 PASCAL, P. I. Prof. Domenico Marinucci. June 1 2012 - May 31 2016.
2010 - 2012	Postdoc in Probability. Department of Statistics, Probability and Applied Statistics, 'Sapienza' University of Rome. Research field: <i>Diffusion Processes on Riemannian manifolds. Theory and Applications.</i> February 1 2010 - January 31 2012.

# **EDUCATION**

- 2010 PhD in Methodological Statistics. Thesis dissertation: Random Processes in Hyperbolic Spaces. Hyperbolic Brownian Motion and Processes with Finite Velocity in the Hyperbolic Plane. 'Sapienza' University of Rome. Advisor: Prof. Enzo Orsingher. February 22 2010.
- 2006 Degree in Mathematical Statistics, 110/110 cum laude. 'Sapienza' University of Rome. Thesis dissertation: Stable Processes and Lévy Processes: Properties, Stochastic Integrals, and Related Distributions. Advisor: Prof. Enzo Orsingher. May 25 2006.
- 2000 | 'Diploma di Maturità Classica' from 'Liceo Classico Statale Orazio', Rome.

#### SUMMER SCHOOLS

- 4-th Barcelona Summer School on Stochastic Analysis. July 9 13, 2018. Centre de Recerca Matemàtica, Barcelona. Instructors: Sylvie Méléard and Mikhail Sodin.
- Berlin Mathematical Summer School 2011. Random Motions and Random Graphs. September 26 October 7 2011. Technische Universität, Berlin. Instructors: Peter Mörters and Nina Gantert.
- PIMS 2010 Summer School in Probability, University of Washington and Microsoft Research, June 21 - July 10 2010. Seattle, U.S.A. Instructors: Jean Bertoin, Scott Sheffield, Zhenqing Chen, Greg Lawler, Eyal Lubetzky, Yuval Peres, David Wilson.
- 39-th Probability Summer School Saint-Flour. July 5 18 2009. Clermont-Ferrand, France. Instructors: Robert Adler and Alison Etheridge.
- PIMS 2008 Summer School in Probability. June 11 July 8 2008. University of British Columbia,
   Vancouver, Canada. Instructors: Krzysztof Burdzy and Geoffrey Grimmett.
- Torgnon Summer School in Statistics and Probability. *Lévy Processes Theory and Applications*. July 2-21 2007. Torgnon, Aosta. Instructors: Gennady Samorodnitsky and Souvik Ghosh.

### LANGUAGES

- Italian
- English
- French (basic knowledge)

# VISITING

- Department of Mathematics, University of Pisa, 13-15 January 2020.
- Academic Visitor of Prof. Igor Wigman, Department of Mathematics, King's College London, February 17-22 2019.
- Academic Visitor of Dr. Igor Wigman, Department of Mathematics, King's College London, February 12-16 2018.
- Visiting Research Associate in the Department of Mathematics, within the Faculty of Natural and Mathematical Sciences at King's College London. From 3 April 2017 until 2 August 2017.
- Academic Visitor of Dr. Igor Wigman, Department of Mathematics, King's College London, May 4-11 and October 12-17 2015.

- Academic Visitor of Dr. Igor Wigman, Department of Mathematics, King's College London, June 1-7 2014.
- Academic Visitor of Dr. Igor Wigman, Department of Mathematics, King's College London, June 18-28 2013.
- Academic Visitor of Prof. Aimé Lachal, INSA DE LYON, Pôle de Mathématiques, February 27 -March 12 2012.
- Academic Visitor of Prof. Peter Mörters, Department of Mathematical Sciences, University of Bath, September 8 2010 - February 1 2011.
- Academic Visitor of Prof. Aimé Lachal, INSA DE LYON, Pôle de Mathématiques, March 2 17 and June 4 - 17 2010.
- Academic Visitor of Prof. Aimé Lachal, INSA DE LYON, Pôle de Mathématiques, February 24 -March 12 and June 16 - 30 2009.

#### **TEACHING**

### INSTRUCTOR

- Postgraduate course: *Probabilistic Models for Finance*, corso di laurea magistrale in 'Ingegneria Gestionale', Sapienza University of Rome. Academic year 2019-2020.
- Postgraduate course: *Stochastic Processes*, corso di laurea magistrale in 'Statistical Methods and Applications', Sapienza University of Rome. Academic years 2018-2019, 2019-2020, 2020-2021.
- Postgraduate course: *Laboratory of Stochastic Processes*, corso di laurea magistrale in 'Statistical Methods and Applications, Sapienza University of Rome. Academic years 2018-2019, 2019-2020, 2020-2021.
- Undergraduate course: Calcolo delle Probabilità e Statistica, corso di laurea triennale in 'Ingegneria Informatica e Automatica', Sapienza University of Rome. Academic year 2017-2018 (in collaboration with prof. Luisa Beghin).
- Postgraduate course: *Processi Stocastici*, corso di laurea magistrale in 'Scienze Statistiche e Decisionali', Sapienza University of Rome. Academic year 2017-2018.
- Postgraduate course: Laboratory of Stochastic Processes, corso di laurea magistrale in 'Scienze Statistiche e Decisionali', Sapienza University of Rome. Academic year 2017-2018.
- Undergraduate course: *Probability and Statistics*, corso di laurea triennale in Ingegneria dell'Informazione Elettronica/Informatica/Telecomunicazioni, Sapienza University of Rome. Academic year 2012-2013.

- Undergraduate course: *Probability and Statistics*, corso di laurea in Ingegneria dell'Informazione Elettronica/Informatica/Telecomunicazioni, Sapienza University of Rome. Academic year 2011-2012.
- Postgraduate and PhD course: *Laboratory of Stochastic Processes*, 'Facoltà di Ingegneria dell'Informazione, Informatica e Statistica', Sapienza University of Rome. Academic year 2011-2012.
- Postgraduate course: *Biomathematics*, 'Scuola di Specializzazione in Statistica Sanitaria, Sapienza University of Rome. Academic year 2007-2008.

#### TUTORIALS

- Tutorials for the course *Path properties of Brownian Motion* given by Prof. Peter Mörters, Berlin Mathematical School Summer School 2011. Technische Universität, Berlin.
- Tutorials for the course Algebra 2A given by Prof. David Calderbank, Department of Mathematical Sciences, University of Bath. Academic year 2010-2011.
- Tutorials for the course *Probability and Statistics*, 'Ingegneria Informatica e Automatica, Sapienza University of Rome. Academic year 2010-2011.
- Tutorials for the course Matematics III, 'Facoltà di Scienze Statistiche, Sapienza University of Rome. Academic year 2009-2010.
- Tutorials for the course *Mathematical Analysis II*, 'Facoltà di Scienze Statistiche, Sapienza University of Rome. Academic year 2008-2009.
- Tutorials for the course *Linear Algebra*, 'Facoltà di Scienze Statistiche, Sapienza University of Rome. Academic year 2008-2009.
- Tutorials for the course *Mathematical Analysis I*, 'Facoltà di Scienze Statistiche, Sapienza University of Rome. Academic year 2007-2008.

### SUPERVISION OF MASTER AND BACHELOR THESES

- Academic year 2019-2020, 'Facoltà di Ingegneria dell'Informazione, Informatica e Statistica', Laurea magistrale in 'Scienze statistiche e decisionali', Sapienza University of Rome, student's name: Stefano Ruggeri, title: Calcolo stocastico per la finanza: teoria e applicazione ai dati Ferrari S.p.A., defence 22 January 2020.
- Academic year 2017-2018, 'Facoltà di Ingegneria dell'Informazione, Informatica e Statistica', Laurea in 'Statistica, economia, finanza e assicurazioni', Sapienza University of Rome, student's name: Camilla Filippini, title: 'Rovina del giocatore: Modelli probabilistici ed esempi applicativi', defence 14 December 2017.

- Academic year 2017-2018, 'Facoltà di Ingegneria dell'Informazione, Informatica e Statistica', Laurea in Statistica, economia, finanza e assicurazioni', Sapienza University of Rome, student's name: Anna Elena Nardoni, title: 'Teoria dei Processi Markoviani e Metodi Monte Carlo Basati su Catene di Markov', defence 25 October 2017.
- Academic year 2014-2015, Department of Mathematics, University of Rome Tor Vergata, student's name: Anna Paola Todino, title: 'Local Maxima of Random Processes and Multiple Testing', defence: October 23 2015.

#### INVITED AND CONTRIBUTED TALKS

- Boundary Effect on the Nodal Length for Arithmetic Random Waves and Spectral Semi-correlations. Invited talk, Conference on Random Nodal Sets, 9 September 2019, Rennes.
- Critical Points of Random Plane Waves and Random Spherical Harmonics. Contributed talk, Second Italian Meeting on Probability and Mathematical Statistics, Vietri, June 17, 2019.
- Boundary Effect on the Nodal Length for Arithmetic Random Waves and Spectral Semi-Correlations.
   Invited talk, 20th Workshop on Stochastic Geometry, Stereology and Image Analysis. 3 June, 2019,
   Sandbjergvej, Denmark.
- Two Point Function for Critical Points of a Random Plane Wave. Invited talk, Workshop: "Optimal Point Configurations and Potential Theory". CIEM, Castro Urdiales, 10 April, 2019.
- Two Point Function for Critical Points of a Random Plane Wave. Contributed talk, 4-th Barcelona Summer School on Stochastic Analysis. July 9 2018.
- Two Point Function for Critical Points of a Random Plane Wave. Invited talk, Workshop "Random Waves in Oxford'. June 21 2018.
- Two Point Function for Critical Points of a Random Plane Wave. Invited talk, Seminar of Probability at Mathématiques Appliquées à Paris 5. April 20 2018.
- Two Point Function for Critical Points of a Random Plane Wave. Invited talk, London Probability Seminar. February 12 2018.
- On critical points and excursion sets of random Laplace eigenfunctions on compact manifolds. Invited speaker. Workshop "Stein's method meets Malliavin's calculus". Department of Mathematics, Ruhr Universität, Bochum, Germany. December 6-8 2017.
- On critical points and excursion sets of random Laplace eigenfunctions on compact manifolds. Invited session 'First Italian Meeting on Probability and Mathematical Statistics'. Torino, Italy. June 19 2017.
- On the critical values of random spherical harmonics and random plane waves. Invited speaker. Workshop on Random Polynomials. Facultad de Ingeniería, Montevideo, Uruguay. February 20-24 2017.

- On the critical values of random spherical harmonics. Invited talk. Seminario di Probabilità e Statistica. Department of Mathematics, Sapienza University of Rome, Italy. January 31 2017.
- On the critical values of random spherical harmonics. Invited talk. Number Theory / Pure Math Seminar at University of Exeter. Department of Mathematics, University of Exeter, U.K. January 26 2017.
- On the critical points of random spherical harmonics. Invited speaker. Workshop Probabilistic Methods in Spectral Geometry and PDE. Centre de Recherches Mathématiques, Montreal, August 22-26 2016.
- Critical points and Euler-Poincaré characteristic of random spherical harmonics. Invited speaker. Conference on Statistical Topology of Random Manifolds: Theory and Applications. The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy. July 18-23 2016.
- A Quantitative Central Limit Theorem for the Euler-Poincare Characteristic of Random Spherical Eigenfunctions. Invited talk. Stochastic and Applied Topology Seminar at the Technion, Faculty of Electrical Engineering Technion Israel Institute of Technology, Haifa, Israel. May 23 2016.
- Fluctuations of the number of critical points of random spherical harmonics. Invited speaker. Workshop 'Random Waves in London'. King's College London. May 3-5 2016.
- Geometrical Properties of Random Spherical Laplace Eigenfunctions. Contributed talk. 12th German Probability and Statistics Days 2016, Bochum, Germany. March 1-4 2016.
- On the Critical Points of Random Spherical Harmonics. Invited talk. King's College Analysis Seminar, London, October 15 2015.
- Fluctuations of the Critical Values and Euler-Poincaré Characteristic of Random Spherical Harmonics. Contributed talk. XX Congresso U.M.I., Siena, Italy. September 7-12 2015.
- Geometrical Properties of Random Spherical Laplace Eigenfunctions. Contributed talk. 38th Conference on Stochastic Processes and their Applications, Oxford. July 13-17 2015.
- On the Distribution of the Critical Values of Random Spherical Harmonics. Invited talk. Dipartimento di Matematica G. Peano, Università degli Studi di Torino. December 15 2014
- Stein-Malliavin Approximations for Needlets Polyspectra. Invited talk. Dipartimento di Scienze Statistiche, 'Sapienza' University of Rome. April 4 2014.
- On the Limiting Behaviour of Needlets Polyspectra. Contributed talk. 11th German Probability and Statistics Days 2014, Ulm, Germany. March 6 2014.
- On the Favourite Points of Planar Brownian Motion. Invited talk. Department of Mathematics, University of Rome 'Tor Vergata'. December 20 2012.
- Random Structures and Dynamics Conference. University of Oxford. 11-14 April 2011.
- Triple Pioneer Points and Random Trees. Invited talk. 'Dipartimento di Scienze Statistiche', 'Sapienza' University of Rome. February 2 2011.
- Pseudo-Processes: Joint Distribution of the Process and its Sojourn Time. Invited talk. Prob-L@b Seminars, Department of Mathematical Sciences, University of Bath, U.K. October 13 2010.
- Branching Structures. A Paris-Bath Meeting. Department of Mathematical Sciences, University of Bath, U.K. September 15 16 2010.

- Pseudo-Processes. Joint Distribution of the Pseudo-Process and its Sojourn Time in (0,+∞).
   Contributed talk. 39-th Probability Summer School Saint-Flour, Clermont-Ferrand, France. July 9 2009.
- Non-Linear Transformations of Cauchy Random Variables. Contributed talk. 'Dipartimento di Statistica, Probabilità e Statistiche Applicate', 'Sapienza' University of Rome. February 16 2009.
- Two-Dimensional Random Motions at Finite Velocity on the Hyperbolic Plane. Contributed talk. PIMS 2008 Summer School in Probability, UBC, Vancouver. June 12 2008.
- Una Relazione di Darling-Siegert per Passeggiate Aleatorie Simmetriche. Contributed talk. 'Dipartimento di Statistica, Probabilità e Statistiche Applicate', 'Sapienza' University of Rome. January 30 2008.
- Passeggiate Aleatorie Persistenti nel Semi-piano di Poincaré. Contributed talk. 'Dipartimento di Statistica, Probabilità e Statistiche Applicate', 'Sapienza' University of Rome. January 26 2007.

### **GRANTS**

- 2020 Principal Investigator of the research project "Progetto Medio di Ricerca di Ateneo", Sapienza.
   Research project: Geometry of Random Fields, n.RM120172B80031BE
- 2020 Co-investigator of the GNAMPA Research Project 2020 "Geometria stocastica e campi aleatori". Istituto Nazionale di Alta Matematica (INdAM).
- 2019 Co-investigator of the GNAMPA Research Project 2019 "Proprietà analitiche e geometriche dei campi aleatori". Istituto Nazionale di Alta Matematica (INdAM).
- 2018 Principal Investigator of the research project "Fondo di Finanziamento delle Attività Base di Ricerca". Research project: 000317\_18\_FFABR-17\_BASE\_di\_RICERCA\_CAMMAROTA
- 2017 Principal Investigator of the research project "Progetto Medio di Ricerca di Ateneo", Sapienza.
   Research project: 000317\_17\_RICERCA\_UNIV\_PROGETTI\_MEDI\_CAMMAROTA

# ACADEMIC SERVICE

- Refereed papers for: ALEA, Bernoulli, Stochastic Processes and their Applications, International Mathematics Research Notices, Journal of Multivariate Analysis, Electronic Journal of Statistics, Journal of Statistical Physics, Acta Mathematica Vietnamitica, Vietnam Journal of Mathematics, Theory of Probability and Mathematical Statistics, Statistics and Probability Letters, Stochastics.
- Member of "Commissione Orientamento, gruppo PLS e ASL". Dipartimento di Scienze Statistiche, Sapienza. Starting from February 21 2019
- Organisation of the seminars supported by the ERC Grant PASCAL http://www.mat.uniroma2.it/~marinucc/Pascal/Events.html.
- Organisation of the workshop "Probabilistic and statistical Techniques for Cosmological applications", hosted by I.N.d.A.M. and supported by the ERC Starting Grant PASCAL. http://www.mat.uniroma2.it/~marinucc/Workshop/Home.html. June 5-7 2013.

May  $28\ 2020$ 

Valentina Cammarota

Nolwie Courte