

Simone Rusconi | Curriculum Vitae

Personal Data

Date of Birth: October 6, 1989

Place of Birth: Como, Italy

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Summary & Research Interests

Ever since my University years, I have been interested in the capabilities of mathematical modelling to understand and predict physical, biological and chemical processes. I firmly believe that interdisciplinary research has the potential to produce effective outcomes of interest to a broad community. For this reason, I have chosen to work in probabilistic modelling and stochastic simulation algorithms targeted to experimental applications, and eventually contribute to public health, industry, environment and society.

During my MSc, PhD studies and in the first years of Postdoctoral Fellowship at Basque Center for Applied Mathematics, I have been collaborating with the experts in Quantum Physics, Chemistry, Chemical Engineering, Biology - as theoreticians as experimentalists - working on modelling of polymerization reactions, quantum measurements and anti-cancer treatments, as well as on implementation of developed models and algorithms on high performance computers. This resulted in 7 scientific publications in high impact (Q1/D1) multidisciplinary journals, such as Computer Physics Communications, Macromolecules and Proceedings of the Royal Society.

I was awarded individual research grants for MSc (Politecnico di Milano), PhD (Severo Ochoa) and postdoctoral (Inst. Nazionale di Alta Matematica) research, and was granted 4 Visiting Fellowships which provided me opportunities to work in the interdisciplinary groups at prestigious Universities like UCSB - University of California (Santa Barbara, USA), Shanghai University (China) and Univeristé de Savoie (France), under supervision of such well-known scientists as Prof. Linda Petzold (UCSB), Prof. Peicheng Zhu (Shanghai University) and Prof. Denys Dutykh (Univeristé de Savoie). I have been invited to give a talk at international conferences and venues in USA, China, France, Italy (Politecnico di Milano), Switzerland (ETH), Spain and have received financial supports from the Isaac Newton Institute for Mathematical Sciences (Cambridge, United Kingdom) and from Red Española de Matemática - Industria [math-in] for participation in summer schools. I have also co-organized 3 International Conferences: 2 in Quantum Physics and 1 in Mathematics for Industry.

Current Position

Postdoctoral Fellow

BCAM - Basque Center for Applied Mathematics, Bilbao, Spain

June 2018 - Present

Research Line: Modelling and Simulation in Life and Material Sciences

Education

Studies

Doctor of Philosophy in Mathematics and Statistics

UPV/EHU - University of the Basque Country, Leioa, Spain

June 2014 - June 2018

Mention: Summa Cum Laude, International PhD Thesis eligible for Extraordinary Doctoral Award

Thesis Title: Probabilistic Modelling of Classical and Quantum Systems

Thesis Supervisors: Prof. Elena Akhmatskaya & Prof. Dmitri Sokolovski

Internship

BCAM - Basque Center for Applied Mathematics, Bilbao, Spain

Sep 2013 - Feb 2014

Research Line: Modelling and Simulation in Life and Material Sciences

Title: Mathematical modeling of Controlled Radical Polymerization

Supervisor: Prof. Elena Akhmatskaya

Master Degree of Mathematical Engineering (Statistics)

Politecnico di Milano, Milano, Italy

2011 - 2014

Final Grade: 110/110

Thesis Title: Mathematical modeling of Controlled Radical Polymerization

Thesis Supervisors: Prof. Maurizio Grasselli & Prof. Elena Akhmatskaya

Bachelor Degree of Mathematical Engineering

Politecnico di Milano, Milano, Italy

2008 - 2011

Final Grade: 106/110

Thesis Title: Dynamics of two competing species

Thesis Supervisor: Prof. Maurizio Grasselli

Computer Skills.....

Operating Systems: Ubuntu, Scientific Linux, Windows

Languages: C, C++, R, Matlab, MS Excel

Parallel CPU: OpenMP, MPI, CUDA

Others: MS Word, MS Power Point, MS Photoshop, \LaTeX

Languages.....

Italian: Mother tongue

English, Spanish: Conversationally fluent

Awards & Grants

2019: Juan de la Cierva-formación 2019. Universidad del País Vasco (UPV-EHU). Ciencias físicas (Reserva).

2019: Titolare di una borsa per l'estero dell'Istituto Nazionale di Alta Matematica "Francesco Severi" (INdAM).

2019: Travel grant for participation in *Spring school on the mathematical design of materials* held at Isaac Newton Institute for Mathematical Sciences (Cambridge, United Kingdom), covered from Institute Workshop funds.

2016: Travel grant for participation in *European Study Group with Industry ESGI 2016* (Barcelona, Spain), funded by EU COST Action MI-Net (Maths for Industry Network).

2015: Travel grant for participation in *Workshop on Mathematical Technology Transfer: CTA-IMUS-math-in* (Sevilla, Spain), funded by Red Española de Matemática - Industria [math-in].

2015: Travel grant for *Visiting Fellowship* at Shanghai University Department of Mathematics (Shanghai, P. R. China), funded by Start-up Grant of Shanghai 1000 Plan.

2015: Travel grant for participation in *8th International Congress on Industrial and Applied Mathematics ICIAM 2015* (Beijing, China), funded by Red Española de Matemática - Industria [math-in].

2015: Travel grant for participation in *New Perspectives in Markov Chain Monte Carlo* school (Valladolid, Spain), funded by Instituto de Matemáticas de la Universidad de Valladolid.

2014: Grant SVP-2014-068451, BCAM Severo Ochoa accreditation SEV-2013-0323, Spanish Ministry of Economy and Competitiveness MINECO.

2012: Grant *Thesis Abroad*, D.D. n. 2451 prot. n. 25166, Politecnico di Milano, Italy.

Research Projects

- ▷ **MICINN project** "Métodos de Integración Geométrica para Problemas Cuánticos, Mecánica Celeste y Simulaciones Monte Carlo", Type of Participation: Researcher. Duration: 01/06/2020 - 31/05/2023. PI(s): Elena Akhmatskaya (BCAM), Ander Murua (UPV/EHU). Reference: PID2019-104927GB-C22. Funded by: MICINN Spain. Amount: 64,977.00 Euros.
- ▷ **ELKARTEK project** "Bg 2020 - Medicina de Precisión en Cáncer: Desarrollo De Herramientas Diagnósticas y Nuevas Terapias". Type of Participation: Researcher. Duration: 01/03/2020 - 31/12/2021. PI: Elena Akhmatskaya (BCAM). Reference: KK-2020/00008. Funded by: Basque Government (ELKARTEK). Amount: 94,000.00 Euros.
- ▷ **ELKARTEK project** "Aprendizaje Eficiente en la Inteligencia Artificial Aplicada a la Industria". Type of Participation: Researcher. Duration: 01/03/2019 - 31/12/2020. BCAM PI: Elena Akhmatskaya (BCAM).

- Reference: KK-2019/00068. Funded by: Basque Government (ELKARTEK). Amount: 33,697.62 Euros.
- ▷ **ELKARTEK project** “Bg 2018 - Medicina Personalizada: Desarrollo De Herramientas De Diagnóstico Y Terapias En Cáncer”. Type of Participation: Researcher. Duration: 01/03/2018 - 31/03/2020. PI: Elena Akhmatskaya (BCAM). Reference: KK-2018/00054. Funded by: Basque Government (ELKARTEK). Coordinator: CIC bioGUNE. Amount: 97,900.00 Euros.
 - ▷ **ELKARTEK project** “Bg 2016 - Investigación Colaborativa En Medicina De Precisión Y Biomarcadores”. Type of Participation: Researcher. Duration: 01/03/2016 - 31/03/2018. PI(s): Elena Akhmatskaya (BCAM), Luca Gerardo-Giorda (BCAM). Reference: KK-2016/00026. Funded by: Basque Government (ELKARTEK). Coordinator: CIC bioGUNE. Amount: 33,697.62 Euros.
 - ▷ **MICINN project** “Electromagnetic Imaging Of The Earth’s Subsurface Using Advanced Galerkin Methods”. Type of Participation: Researcher. Duration: 30/12/2016 - 29/12/2019. PI(s): David Pardo (BCAM), Elena Akhmatskaya (BCAM). Reference: MTM2016-76329-R. Funded by: MICINN. Amount: 90,871.00 Euros.

Visiting Fellowships

- ▷ **LAMA - Laboratoire de Mathématiques**, *Univeristé de Savoie*, Le Bourget-du-Lac, France, August 28 - September 29, 2017. Supervisor: Prof. Denys Dutykh.
- ▷ **Department of Mathematics**, *Shanghai University*, Shanghai, People’s Republic of China, August 17-19, 2015. Supervisor: Prof. Peicheng Zhu.
- ▷ **Computational Science and Engineering Research Group**, *UCSB - University of California*, Santa Barbara, USA, April 8 - June 5, 2015. Supervisor: Prof. Linda Petzold.
- ▷ **LAMA - Laboratoire de Mathématiques**, *Univeristé de Savoie*, Le Bourget-du-Lac, France, January 19-23, 2015. Supervisor: Prof. Denys Dutykh.

Mentoring Activity

- ▷ Supervisor of Mr. Jorge Lemos (Bachelor student, Universidad Autonoma de Madrid, Spain), working on the project “Tracking development of resistance to anti-cancer therapy through mathematical modeling” at Basque Center for Applied Mathematics (Bilbao, Spain) from 27/05/2019 to 27/07/2019.

Attended Schools & Workshops

- ▷ *An Introduction to Randomized Quasi-Monte Carlo Methods and its Applications*, Basque Center for Applied Mathematics, Bilbao, Spain, 2020.
- ▷ *DSABNS - Dynamical Systems Applied to Biology and Natural Sciences*, Università degli Studi di Trento, Trento, Italy, 2020.
- ▷ *BiDAS 4 - Fourth Bilbao Data Science Workshop*, Basque Center for Applied Mathematics, Bilbao, Spain, 2019.
- ▷ *European Study Group with Industry ESGI 150*, Basque Center for Applied Mathematics, Bilbao, Spain, 2019 (Academic Coordinator).
- ▷ *Introduction to Piecewise Deterministic Markov Processes and Applications to Neuroscience*, Basque Center for Applied Mathematics, Bilbao, Spain, 2019.
- ▷ *Theory of Coarse-Graining and its applications towards the modelling of complex fluids*, Basque Center for Applied Mathematics, Bilbao, Spain, 2019.
- ▷ *Spring school on the mathematical design of materials*, Isaac Newton Institute for Mathematical Sciences, Cambridge, United Kingdom, 2019.
- ▷ *Population Dynamics: Theory and Approximation*, Basque Center for Applied Mathematics, Bilbao, Spain, 2016.
- ▷ *BCAM-IMUVA Summer School on Uncertainty Quantification for Applied Problems*, Universidad de Deusto, Bilbao, Spain, 2016.
- ▷ *IV International Congress on Multiphysics, Multiscale and Optimization Problems*, BCAM, Bilbao, Spain, 2016.
- ▷ *European Study Group with Industry ESGI 2016*, Centre de Recerca Matemàtica, Barcelona, Spain, 2016.
- ▷ *Workshop on Mathematical Technology Transfer: CTA-IMUS-math-in*, Universidad de Sevilla, Sevilla, Spain, 2015.
- ▷ *8th International Congress on Industrial and Applied Mathematics ICIAM 2015*, Beijing, China, 2015.
- ▷ *V Workshop Quantum Days in Bilbao*, BCAM, Bilbao, Spain, 2015 (Organizing Committee).
- ▷ *New Perspectives in Markov Chain Monte Carlo*, Universidad de Valladolid, Valladolid, Spain, 2015.
- ▷ *A Two-day Meeting on Mathematical Biology*, ICMAT - Instituto de Ciencias Matemáticas, Madrid, Spain, 2014.
- ▷ *IV Workshop Quantum Days in Bilbao*, BCAM, Bilbao, Spain, 2014 (Organizing Committee).

Invited Talks

1. *Population Balance Approach for Predicting Polymer Particles Morphology*, DSABNS - Dynamical Systems Applied to Biology and Natural Sciences, Università degli Studi di Trento, Trento, Italy, February 5, 2020.
2. *Modelling Controlled Radical Polymerization: A Proposed Solution to Unresolved Issues*, Control Theory and Systems Biology Laboratory, ETH Zürich, Switzerland, April 16, 2019.
3. *Multi-phase Particles Morphology Formation: Model & Methods*, MOX-Laboratory for Modeling and Scientific Computing, Politecnico di Milano, Italy, December 21, 2018.
4. *A Computationally Feasible Model for Multiphase Particles Morphology Formation*, Separation Processes Laboratory, ETH Zürich, Switzerland, December 7, 2018.
5. *Modelling & Simulation of Classical and Quantum Systems*, BCAM LIGHT seminar, BCAM, Bilbao, Spain, May 22, 2018.
6. *Probabilistic Modelling of Classical and Quantum Systems*, BCAM Scientific Advisory Committee Meeting, BCAM, Bilbao, Spain, May 2, 2018.
7. *Stochastic Simulation of Continuous Quantum Measurements*, LAMA - Laboratoire de Mathématiques, Université de Savoie, Le Bourget-du-Lac, France, September 28, 2017.
8. *Prediction of Polymers Particles Morphology Development: Models and Methods*, Fourth International Congress on Multiphysics, Multiscale, and Optimization Problems, BCAM, Bilbao, Spain, May 27, 2016.
9. *Mathematical Modeling of Chemical Reactions at Basque Center for Applied Mathematics*, Workshop on Mathematical Technology Transfer: CTA-IMUS-math-in, Universidad de Sevilla, Sevilla, Spain, December 11, 2015.
10. *Mathematical Modelling of Polymers Particles Production*, Minisymposium Success Stories of Spanish Industrial Mathematics with Industry, ICIAM 2015, Beijing, China, August 14, 2015.
11. *Mathematical Modelling of Polymers Particles Production*, Minisymposium Particle Systems and Particulate Flows in Environmental, Social and Industrial Applications, ICIAM 2015, Beijing, China, August 11, 2015.
12. *Dynamic Development of Particles Morphology*, University of California, Santa Barbara, USA, April 9, 2015.
13. *Kinetic Processes in Controlled Radical Polymerization*, BCAM Scientific Seminar, BCAM, Bilbao, Spain, February 3, 2015.
14. *Modelling of Delayed Processes in Controlled Radical Polymerization*, LAMA - Laboratoire de Mathématiques, Université de Savoie, Le Bourget-du-Lac, France, January 23, 2015.
15. *Mathematical Modeling of Chemical Reactions Kinetics*, IV Workshop Quantum Days in Bilbao, BCAM, Bilbao, Spain, July 16, 2014.
16. *Study on Controlled Radical Polymerization*, Workshop on Dynamical Systems and Applications, BCAM, Bilbao, Spain, December 11, 2013.
17. *Parallel Slice Sampling*, Bayesian Young Statistician Meeting 2013, CNR-IMATI, Milano, Italy, June 6, 2013.

Publications

- [1] **S. Rusconi**, D. Dutykh, A. Zarnescu, D. Sokolovski, E. Akhmatskaya. *An optimal scaling to computationally tractable dimensionless models: Study of latex particles morphology formation*, Comput. Phys. Commun. 247: 106944, 2020. **IF 2018 (JCR) = 3.309, D1.**
- [2] D. Sokolovski, **S. Rusconi**, S. Brouard, E. Akhmatskaya. *Reexamination of continuous fuzzy measurement on two-level systems*, Phys. Rev. A 95 (4): 042111, 2017. **IF 2017 (JCR) = 2.909, Q1.**
- [3] V. Cregan, R. Bacsa, M. Calvo Schwarzwälder, M. Fernández-Pendás, B. Florio, A. Marquina, I. Moyles, T. Myers, H. Ribera Ponsa, **S. Rusconi**, S. Serna. *Synthesis of Monodisperse Spherical Nanocrystals*. Proceedings of the 115th European Study Group with Industry, Barcelona, January 2016. ISBN: 978-84-697-5163-3.
- [4] **S. Rusconi**, E. Akhmatskaya, D. Sokolovski, N. Ballard, J.C. de la Cal. *Relative Frequencies of Constrained Events in Stochastic Processes: an Analytical Approach*, Phys. Rev. E 92 (4): 043306, 2015. **IF 2015 (JCR) = 2.252, Q1.**
- [5] D. Sokolovski, **S. Rusconi**, E. Akhmatskaya, J.M. Asua. *Non-Markovian models of the growth of a polymer chain*, Proc. R. Soc. A 471: 20140899, 2015. **IF 2015 (JCR) = 1.935, Q2.**
- [6] N. Ballard, **S. Rusconi**, E. Akhmatskaya, D. Sokolovski, J.C. de la Cal, J.M. Asua. *Impact of Competitive Processes on Controlled Radical Polymerization*, Macromolecules 47 (19), 6580-6590, 2014. **IF 2014 (JCR) = 5.800, D1.**
- [7] T. Pietrabissa, **S. Rusconi**. *The Contribution of Young Researchers to Bayesian Statistics*, Chapter 16. Proceedings of BAYSM 2013, Milano, June 2013. ISBN: 978-3-319-02083-9.

Bilbao (Spain), September 21, 2020

