Simoy Mario Ignacio

Curriculum Vitae

September 2021

Personal information

Date of Birth: 7/14/1987
Place of Birth: Saladillo, Province of Buenos Aires.
Nationality: Argentine.
Identity Card: D.N.I N° 33.268.415.
Address: Pasaje Mons. Diaz, 224. Salta, Argentina.
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Current Position

- **Posdoctoral research fellowship** awarded by CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas) at Instituto de Investigaciones en Energia No Convencional (Salta, Argentina).

  Research Topic: Mathematical and computational modeling of the dynamics and transmission of dengue in localities with non-endemic patterns.

  Advisor: Ph. D. Juan Pablo Aparicio.

- **Teaching Assistant.** "Mathematical Analysis I" and "Probability and Statistics", undergraduate courses for students in Mathematics, Physics, Environmental Technology, and Computer Sciences. Universidad Nacional del Centro de la Provincia de Buenos Aires, Tandil, Argentina.

Education

- **Doctor in Computational and Industrial Mathematics**. Universidad Nacional del Centro de la Provincia de Buenos Aires (UNCPBA). Argentina, 2019.

  Title of thesis: Modelo metapoblacional de dispersión de Brucelosis Bovina en redes de movimiento de ganado vacuno. (Metapopulation model of spread of Bovine Brucellosis in movement networks of cattle).

  Advisors: Dr. Graciela Ana Canziani and Dr. María Verónica Simoy.

- **Degree in Mathematics**, Universidad Nacional del Centro de la Provincia de Buenos Aires (UNCPBA). Argentina, 2014. Average: 9.23 over 10.

  Title of thesis: Modelo estructurado discreto de la dinámica poblacional del mosquito Aedes aegypti en función de la temperatura (A discrete structured model for the population dynamics of the Aedes aegypti mosquito as a function of temperature).

  Advisors: Dr. Graciela Ana Canziani and Dr. Maria Verónica Simoy

Scholarships

- **Postdoctoral research fellowship** awarded by **Consejo Nacional de Investigaciones Científicas y Técnicas** (CONICET). Research Topic: *Mathematical and computational modeling of the dynamics and transmission of dengue in localities with non-endemic patterns*. Period: April 2019 - March 2021. Advisor: Dr. Juan Pablo Aparicio.
- **Doctoral research fellowship** awarded by **Consejo Nacional de Investigaciones Científicas y Técnicas** (CONICET). Research Topic: *Mathematical modelling of infectious diseases: effects of individual contacts in the propagation and control of epidemics.* Period: April 2014 - March 2019. Advisor: Dr. Graciela Ana Canziani.
- Scholarship **"Training for Undergraduate Students" (BENTR12)** awarded by **Comisión de Investigaciones Científicas de la Provincia de Buenos Aires** (CICPBA). Period: October 2012 - September 2013. Advisor: Dr. Graciela Ana Canziani, Coadvisor: Dr. Maria Verónica Simoy.
- Scholarship **"Stimulus to Scientific Vocations"** awarded by **Consejo Interuniversitario Nacional** (CIN). Period: August 2010 - September 2011. Advisor: Dr. Graciela Ana Canziani.
- Scholarship **"Support for Talented Young Students in Basic Sciences (Physics, Mathematics, and Chemistry)"**, a CICPBA Program. Period: February 2008 - December 2008. Tutor: Dr. Leonardo Cabrer.

Grants for participation in scientific activities

- Grant awarded by the **Society for Mathematical Biology (SMB)** for attending and presenting research results at the **X Congreso Latinoamericano de Biomatemática (SOLABIMA)**, at Cuzco, Peru, from 7 to 11 August 2017.
- Grant awarded by the **International Centre for Theoretical Physics - (ICTP)** to participating in the international **Workshop on Mathematical Models of Climate Variability, Environmental Change and Infectious Diseases** at ICTP, Trieste, Italy, from 8 to 17 May 2017.
- Grant awarded by the **International Centre for Theoretical Physics - South American Institute for Fundamental Research (ICTP - SAIFR)** to participating in the international **School on Pathogen Dynamics, Climate and Global Change** at ICTP - SAIFR, Sao Pablo, Brazil, from 12 to 23 January 2015.
- Grant awarded by the **Faculty of Exact Sciences**, UNCPBA for attending and presenting research results at the **International scientific meeting Models in Population Dynamics and Ecology (MPDE12)**, at Universidade Federal de Santa Maria, Brazil, from 10 to 13 September 2012.

Participation in research projects

- **Research assistant** in the project *COVID-19. Encuesta serológica estratificada por edad basada en la población del partido de Tandil (Provincia de Buenos Aires). Modelos para el análisis de escenarios futuros.* (COVID-19. Age-stratified serological survey based on the population of the Tandil district (Province of Buenos Aires). Models for the analysis of future scenarios.). (2020 - 2021). Director: Dra. Mariana A. Rivero.
- **Research assistant** in the project *Dinámica de enfermedades tropicales en el norte de Salta* (Tropical disease dynamics in northern Salta). (2019 - 2022). Director: Dr. Juan P. Aparicio.
- **Research assistant** in the project *Desarrollo de modelos matemáticos aplicados a la conservación del ambiente, el uso sostenible de los recursos y el bienestar de la comunidad* (Development of mathematical models applied to the environment's conservation, the sustainable use of resources and the community's well-being). (2017-2019). Director: Mg. Claudia Marinelli, Co-director: Eng. Rosana Ferrati. (Cód. 03/C280).
- **Research assistant** in the project *Estudios sobre el Ambiente y la Salud a través del Desarrollo de Herramientas Matemáticas, Estadísticas y Computacionales* (Studies on Health and Environment through the development of Mathematical, Statistical, and Computational Tools). (2014-2016). Director: Dr. Graciela. A. Canziani. Co-director: Eng. Rosana Ferrati. (Code 03/C251).

Peer-reviewed articles

4. Fleitas, P.E., Paz J.A., **Simoy, M.I.**, Vargas, C., Cimino, R.O., Krolewiecki, A.J., & Aparicio, J.P. (2021). Clinical diagnosis of COVID-19. A multivariate logistic regression analysis of symptoms of COVID-19 at presentation. GERMS. 11(2), 221-237. doi:10.18683/germs.2021.1259.

3. **Simoy, M. I.**, Simoy, M. V., & Canziani, G. A. (2021). Herd dynamics age and sex structured model considering management practices and animal movements among districts. Applied Mathematical Modelling, 96, 53-65. doi:10.1016/j.apm.2021.02.009

2. **Simoy, M. I.**, & Aparicio, J. P. (2020). Ross-Macdonald Models: Which one should we use?. Acta tropica, 207, 105452. doi:10.1016/j.actatropica.2020.105452.

1. **Simoy, M. I.**, Simoy, M. V., & Canziani, G. A. (2015). The effect of temperature on the population dynamics of Aedes aegypti. Ecological Modelling, 314, 100-110. doi:10.1016/j.ecolmodel.2015.07.007.

Complete manuscript published in conference proceedings

4. **Simoy, M.I.**, & Aparicio, J.P. (2021). Modelo con estructura social para el estudio de medidas de control de la pandemia de COVID-19. Proceedings of VIII MACI 2021. Available online

3. Aparicio, J.P., & **Simoy, M.I.** (2019). Population and Individual Based Ross-Macdonald Models: Which one should we use? XI Congreso Latinoamericano de Biología Matemática, Talca, Chile. Available online

2. **Simoy, M.I.**, Simoy, M.V., Canziani, G.A. (2019). Modelo poblacional de ganado estructurado en edades y sexo. XI Congreso Latinoamericano de Biología Matemática, Talca, Chile. Available online

1. Nardín, M. A., & **Simoy, M. I.** (2012) Modelo matemático para analizar la dinámica poblacional del Guanaco (Lama guanicoe) en un establecimiento agropecuario en la Provincia de Neuquén. I Jornadas Nacionales de Ambiente: Trabajos Completos, FCH-UNCPBA, Pgs. 116 - 132 (ISBN 978-950-658-315-6).

Submitted manuscripts

- **Simoy, M. I.**, & Aparicio, J. P. Vector-borne disease models with active and inactive vectors: a simple way to consider biting behavior. Submitted to Bulletin of Mathematical Biology (accepted with minor revisions).
- **Simoy, M. I.**, Simoy, M. V., & Canziani, G. A. Epidemic metapopulation model on weighted directed networks with pulse movements between nodes. Submitted to International Journal of Applied and Computational Mathematics (accepted with minor revisions).
- **Simoy, M. I.**, & Aparicio, J. P. Socially structured model for COVID-19 pandemic: design and evaluation of control measures. Submitted to Computational and Applied Mathematics (under review).
- **Simoy, M. I.**, & Aparicio, J. P. The super-spreaders role in socially structured disease models: the COVID-19 case. Submitted to Mathematical Modelling of Natural Phenomena (under review).

Technical reports

2. Aparicio, J.P., **Simoy, M.I.**, Simoy, M.V., Fabricius, G., Kuperman, M.N., Sibona, G.J., Solari, H.G. (2020) *Algunas ideas para repensar la epidemia de COVID-19*. Red de Investigación Traslacional en Salud (RITS). Available online.

1. Solari, H.G. & **Simoy, M.I.** (2020) *Informe sobre la propagación de COVID-19 en Argentina. Análisis y recomendaciones*. Unidad Coronavirus COVID-19, Ministerio de Ciencia, Tecnología e Innovación, Argentina.

Communications

13. Modelo con estructura social para el estudio de medidas de control de la pandemia de COVID-19.
Simoy, M.I., & Aparicio, J.P. VIII Congreso de Matemática Aplicada, Computacional e Industrial, at La Plata, Argentina, May 3 - 7, 2021.

12. Manejo de la pandemia de COVID-19: un estudio basado en un modelo matemático con estructura social.
Simoy, M.I., & Aparicio, J.P. LXIX Reunión de Comunicaciones Científicas - Reunión Anual Virtual de la Unión Matemática Argentina (virtUMA 2020), September 14 - 25, 2020.

11. Population and Individual Based Ross-Macdonald Models: Which one should we use?
Aparicio, J.P. & **Simoy, M.I**. XI Congreso Latinoamericano de Biología Matemática, at Talca, Chile, October 22 - 25, 2019.

10. Modelo poblacional de ganado estructurado en edades y sexo.
Simoy, M.I., Simoy, M.V., Canziani, G.A. XI Congreso Latinoamericano de Biología Matemática, at Talca, Chile, October 22 - 25, 2019.

9. Modelo SEIV metapoblacional en redes para el análisis de la difusión de enfermedades del ganado bovino en Argentina.
Simoy, M.I., Simoy, M.V., Canziani, G.A. I Coloquio Internacional de Biometría en Ciencias de la Vida (I COBIOVI), at Lima, Perú, December 5 - 7, 2018.

8. Modelo epidemiológico metapoblacional en redes con movimientos pulso.
Simoy, M.I., Simoy, M.V., Canziani, G.A. Reunión Conjunta de la Unión Matemática Argentina y la Real Sociedad Española de Matemática, at Ciudad Autónoma de Buenos Aires, December 11 - 15, 2017.

7. Sitios prioritarios para la conservación del Pastizal Serrano.
Trofino Falasco, C., Cortelezzi, A., Cepeda, R., Di Giacomo, A., Dopazo, J., Kacoliris, F., Marinelli, C., Mariottini, Y., Martínez Aguirre, T., Simoy, M.V., **Simoy, M.I.**, Berkunsky, I. V Congreso Nacional de Conservación de la Biodiversidad, at Las Grutas, Río Negro, September 19 - 22, 2017.

6. Is camera trapping an effective method to detect grassland birds?.
Trofino Falasco, C., Cortelezzi, A., Cepeda, R., Di Giacomo, A., Dopazo, J., Marinelli, C., Simoy, M.V., **Simoy, M.I.**, Berkunsky, I. Ornithological Congress of the Americas, at Puerto Iguazú, Misiones, August 8 - 11, 2017.

5. Modelo SIR metapoblacional en redes.
Simoy, M.I., Simoy, M.V., Canziani, G.A. X Congreso Latinoamericano de Biomatemática, organized by Sociedad Latinoamericana de Biomatemática at Cuzco, Peru, August 7 - 11, 2017.

4. Modelo matemático para estudiar el efecto de la temperatura en la dinámica poblacional del mosquito Aedes aegypti.
Simoy, M.I., Simoy, M.V., Canziani, G.A. LXIII Reunión de Comunicaciones Científicas - Reunión Anual de la Unión Matemática Argentina, organized by Unión Matemática Argentina at Universidad Nacional de San Luis, San Luis, September 17-20, 2014.

3. Modelo poblacional discreto estructurado en estadíos para el mosquito Aedes aegypti: una primera aproximación.
Simoy, M.I., Simoy, M.V., Canziani, G.A. 8vo Congreso Latinoamericano de Biomatemática, SOLABIMA 2013, organized at Universidad Nacional de Luján, October 15 - 18, 2013.

2. Modelo matemático para analizar la dinámica poblacional del Guanaco (Lama guanicoe) en un establecimiento agropecuario en la Provincia de Neuquén.
Nardín, M.A. & **Simoy, M.I.** I Jornadas Nacionales de Ambiente 2012 "Ambiente: compromiso de todos", organized at Universidad Nacional del Centro de la Provincia de Buenos Aires, Tandil, October 31 - November 2, 2012.

1. Analysis of sustainable harvest of guanaco population in Patagonia using a stage-structured matrix model.
Simoy, M.I. & Nardín, M.A. Models in Population Dynamics and Ecology (MPDE12), international congress organized at Universidade Federal de Santa María, Brasil, September 10 - 13, 2012.

Supervision in undergraduate research

1. Fátima Chauque (Degree in Math). Title of the undergraduate thesis: *Modelo de la dinámica de transmisión de Brucelosis Bovina* (Transmission dynamics model of Bovine Brucellosis). Faculty of Exact Sciences, Universidad Nacional de Salta, Argentina. (2019 - 2020).

Courses

Doctoral Courses

Courses corresponding to the Doctoral Program on Computational and Industrial Mathematics.

- Stochastic differential equations and its relationship with differential equations in partial derivatives. Score 9 (nine). Date: 04/16/2015
- Epistemology and methodology of science. Score 9 (nine). Date: 02/24/2016
- Mathematical models of physics. Score 10 (ten). Date: 03/15/2016
- Non-differentiable convex optimization. Score 10 (ten). Date: 04/21/2016
- Games and Strategies: from nature to models. Score 10 (ten). Date: 08 /05/2016.
- Monte Carlo Estimation Methods. Score 10 (ten). Date: 03/15/2017.
- Stochastic Integration. Score 10 (ten). Date: 05/11/2017.
- Tools for biostatistical analysis. Score 10 (ten). Date: 09/05/2017.
- Advanced algorithms and data structure. Score 10 (ten). Date: 03/15/2018.

Undergraduate courses

Besides the courses corresponding to the Degree in Mathematics, I have taken a number of courses corresponding to the career in Systems Engineering, Faculty of Exact Sciences, UNCPBA. These are:

- Analysis and Design of Algorithms I. Score: 9 (nine). Date: 05/08/2011.
- Introduction Differential and Integral Calculus. Score: 8 (eight). Date: 24/06/2011.
- Introduction to Systems Architecture. Score 8 (eight) Date: 03/05/2011.
- Electricity and Magnetism. Score 8 (eight). Date: 17/02/2011.
- Introduction to Programming II. Score 8 (eight). Date: 19/02/2008.
- Introduction to Programming I. Score 10 (ten). Date: 18/12/2007.
- Computer Sciences II. Score 9 (nine). Date: 18/03/2011.
- Computer Sciences I. Score 8,50 (eight 50/100). Date: 20/7/2007.
- General Physics. Score 9 (nine). Date: 29/03/2007.

Scientific programming skills

I have programming experience in the following languages: **R**, **Matlab**, **Scilab**, **C/C**++.

Scientific meetings attendance

24. VIII Congreso de Matemática Aplicada, Computacional e Industrial, at La Plata, Argentina, May 3 - 7, 2021.

23. Reunión Anual Virtual de la Unión Matemática Argentina (virtUMA 2020), September 14 - 25, 2020.

22. XI Congreso Latinoamericano de Biología Matemática, at Talca, Chile, October 22 - 25, 2019.

21. I Coloquio Internacional de Biometría en Ciencias de la Vida (I COBIOVI), at Lima, Perú, December 5 - 7, 2018.

20. 8va Escuela Argentina de Matemática y Biología (BIOMAT), at La Falda, Córdoba, from 24 to 29 June 2018.

19. Reunión Conjunta de la Unión Matemática Argentina y la Real Sociedad Española de Matemática, at Ciudad Autónoma de Buenos Aires, December 11 - 15, 2017.

18. X Congreso Latinoamericano de Biomatemática (SOLABIMA), organized by the Sociedad Latinoamericana de Biomatemática, at Cuzco, Perú, from 7 to 11 August 2017.

17. 2nd Conference on Impact of Environmental Changes on Infectious Diseases, organized by International Centre for Theoretical Physics -(ICTP), at ICTP, Trieste, Italy, from 17 to 19 May 2017.

16. Workshop on Mathematical Models of Climate Variability, Environmental Change and Infectious Diseases, organized by International Centre for Theoretical Physics -(ICTP), at ICTP, Trieste, Italy, from 8 to 17 May 2017.

15. 7ma Escuela Argentina de Matemática y Biología (BIOMAT), at La Falda, Córdoba, from 30 July to 2 August 2016.

14. School on Pathogen Dynamics, Climate and Global Change, organized by International Centre for Theoretical Physics - South American Institute for Fundamental Research (ICTP - SAIFR), at ICTP - SAIFR, Sao Pablo, Brazil, from 12 to 23 January 2015.

13. LXXIII Reunión de Comunicaciones Científicas, organized by UMA, at Universidad Nacional de San Luis, San Luis, September 17-20, 2014.

12. 8vo Congreso Latinoamericano de Biomatemática, SOLABIMA 2013, organized at Universidad Nacional de Luján, Luján, October 15-18, 2013.

11. I Jornadas Nacionales de Ambiente 2012 "Ambiente: compromiso de todos", organized at Universidad Nacional del Centro de la Provincia de Buenos Aires from October 31-November 2, 2012.

10. Models in Population Dynamics and Ecology (MPDE12), organized at Universidade Federal de Santa María, Brasil, September 10-13, 2012.

9. XIV Encuentro de Estudiantes de Matemática, and XXXV Reunión de Educación Matemática, organized by the UMA, at Universidad Nacional de Córdoba, Córdoba, August 6-8, 2012.

8. 5º Escuela Argentina de Matemática y Biología (BIOMAT), organized by Faculty of Mathematics, Physics and Astronimy, Universidad Nacional de Córdoba, in La Falda, Córdoba, July 30-August 2, 2012.

7. 1º Congreso Regional de Estudiantes de Ciencias Exactas, at Universidad Nacional de La Plata, 3 June 2-3, 2012.

6. XXIII Reunión de Estudiantes de Matemática, XXXIV Reunión de Educación Matemática, LXXI Reunión de Comunicaciones Científicas, organized by UMA, at Universidad Nacional de Tucumán, San Miguel de Tucumán, September 20-23, 2011.

5. XXII Reunión de Estudiantes de Matemática, XXXIII Reunión de Educación Matemática, LX Reunión de Comunicaciones Científicas, organized by UMA, at Universidad Nacional del Centro de la Provincia de Buenos Aires, Tandil, September 27-October 2, 2010.

4. XXI Reunión de Estudiantes de Matemática, XXXII Reunión de Educación Matemática, LXIX Reunión de Comunicaciones Científicas, organized by UMA, at Universidad Nacional de Mar del Plata, September 21-26, 2009.

3. II Winter School "Luis A. Santaló", organized by the Department of Mathematics, Faculty of Exact and Natural Sciences, Universidad de Buenos Aires, from 12 to 15 August, 2009.

2. XX Reunión de Estudiantes de Matemática, XXXI Reunión de Educación Matemática, LXVIII Reunión de Comunicaciones Científicas, organized by UMA, at Universidad Nacional de Cuyo, Mendoza, September 22-27, 2008.

1. IX Encuentro de Matemática "Mar y Sierras", organized by the Universidad Nacional del Centro de la Provincia de Buenos Aires, Tandil, November 21-23, 2007.

Teaching

- Teaching assistant in the course "Mathematical Analysis I" from 2018 to this day.
- Teaching assistant in the course "Probability and Statistics" form 2011 to this day.
- Teaching assistant in the course "Introduction to Differential and Integral Calculus" from 2012 until 2017.
- Teaching assistant in the course "Mathematical Analysis II" during 2009.

Institutional activities

- Member of the Departmental Advisory Council, representing Teaching Assistants in the Department of Mathematics, Faculty of Exact Sciences, UNCPBA, elected for the period 2017 - 2018.
- Member of the Universty's Superior Council, as Student representative from Faculty of Exact Sciences, UNCPBA, elected for the year 2013.
- Member of the Academic Council, as Student representative, Faculty of Exact Sciences, UNCPBA, elected during two consecutive periods: 2011 and 2012.
- Member of the Departmental Advisory Council, as Student representative in the Department of Mathematics, Faculty of Exact Sciences, UNCPBA, elected for the period 2009.