

DR. PATRICIA TERNES

RESEARCH SOFTWARE ENGINEER

Research Computing, University of Leeds

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PROFILE

I am a Research Software Engineer at the Research Computing, University of Leeds, UK. My responsibilities encompass a range of software development, high performance and computing related activities including user support, documentation and training, as well as build and support innovative solutions to research problems. I have research experience on the development of computer models that help to understand complex systems; initially focusing on phenomena such as the behaviour of fluids at nano-scales and lately modelling emergence in spatio-social systems, using spatial microsimulation model, agent-based modelling, machine learning and data assimilation techniques.

In the last year, my activities included collaboration with several researchers and stakeholders from different areas and backgrounds, students' supervision, project leadership, material development, training delivering, paper writing, and funding applications.

RESEARCH EXPERIENCE

Research Software Engineer

Research Computing, University of Leeds, Leeds, UK

- **RSE Research Computing Team:** design, build and support innovative solutions to research problems. Jan 2022 - Present
- **PI LIDA Data Scientist Development Programme.** Project: Modelling ambient populations under different restriction schemes.
- **Staff Leadership:** Supervising LIDA Data Scientist, Masters and PhD students.
- **Teaching Leadership:** Developing material and providing training for the EPSRC-CDT in Computational Fluid Dynamics students.

Research Fellow

School of Geography, University of Leeds, Leeds, UK

- **PDRA Data Assimilation for Agent-Based Models:** Develop a cutting-edge dynamic data assimilation methods for use in agent-based models. Nov 2019 - Jan 2022
- **PDRA Towards A Flexible, Sustainable Urban Energy System:** Develop a spatial microsimulation model of people's presence and their daily activities at a high resolution.
- **co-PI Turing-LIDA Data Study Group:** working together with organisations (industry, government, the third sectors) and multi-disciplinary researchers to solve real-world problems.
- **Staff Leadership:** Supervising Data Science Interns, Masters and PhD students. Offering technical training for Data Science Interns.
- **Research Leadership:** Planning new research objectives and implementing new research directions.

TEACHING EXPERIENCE

Substitute Professor

Federal Institute Catarinense, São Bento do Sul, Brazil

- **Main duties:** Full academic appointment, including undergraduate teaching, research and administrative activities. Mar 2018 - Oct 2019
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Workshops Tutor

Training: Software development - good practices and tips EPSRC-CDT in Computational Fluid Dynamics, University of Leeds, UK.	Mar 2022
Training: Advanced Python Leeds Institute for Data Analytics, University of Leeds, UK.	Oct 2021
Training: Intro to LaTeX Leeds Institute for Data Analytics, University of Leeds, UK.	Oct 2021
Training: A brief introduction to LaTeX Federal Institute Catarinense, São Bento do Sul, Brazil.	Nov 2018

Internships

Inclusive Education Sector, Federal University of Santa Catarina, Florianópolis, Brazil. Main duties: Pedagogical supervision and tutoring students who have disabilities.	Aug 2011 - June 2012
Science Room, Social Service of Commerce (SESC), Florianópolis, Brazil. Main duties: Interdisciplinary science activities for children, youth and adults.	Mar 2010 - Dec 2010
Science Park, Federal University of Santa Catarina, Florianópolis, Brazil. Main duties: Guided tours in the Science Park for people over 10 years old.	Mar 2009 - Dec 2009

EDUCATION

- PhD in Science: Theoretical Physics, Physics Institute, Federal University of Rio Grande do Sul, Brazil (2018).
- MSc. in Physics, Physics Department, Federal University of Santa Catarina, Brazil (2014).
- Licenciatura* in Physics, Physics Department, Federal University of Santa Catarina, Brazil (2012).

AWARDS & FUNDING

Awards

2021 Title	Michael Beverley Associate Innovation Fellow
2014 - 2018 Doctoral Scholarship	Brazilian National Council for Scientific and Technological Development (CNPq)
2012 - 2014 Masters Scholarship	Brazilian National Council for Scientific and Technological Development (CNPq)

Research funding as principal investigator: Total £ 35,000

2021 £18,500	Modelling ambient populations under different restriction schemes. ESRC Impact Acceleration Account (ESRC IAA)
2019 BRL 58,600	Nanoconfined water diffusion: the role of friction and the effects of temperature and density water. Brazilian National Council for Scientific and Technological Development (CNPq), Grant no. 157758/2019-2, Brazil
2019 BRL 58,850	Agents with psychological characteristics: the impact of network topology on an artificial stock market. Brazilian National Council for Scientific and Technological Development (CNPq), Grant no. 170380/2018-1, Brazil

PUBLICATIONS

Peer-Reviewed Journal Articles

Clay, Robert, Jonathan A Ward, **Patricia Ternes**, Le-Minh Kieu, and Nick Malleson (2021). "Real-time agent-based crowd simulation with the Reversible Jump Unscented Kalman Filter". In: *Simulation Modelling Practice and Theory* 113, page 102386.

Ternes, Patricia, Jonathan A Ward, Alison Heppenstall, Vijay Kumar, Le-Minh Kieu, and Nick Malleson (2021). "Data assimilation and agent-based modelling: towards the incorporation of categorical agent parameters". In: *Open Research Europe* 1.131, page 131.

Mendonça, Bruno H.S., **Patricia Ternes**, Evy Salcedo, A. B. de Oliveira, and Marcia C. Barbosa (2020). "Water diffusion in carbon nanotubes: Interplay between confinement, surface deformation, and temperature". In: *The Journal of Chemical Physics* 153.24, page 244504.

Mendonça, Bruno H.S., **Patricia Ternes**, Evy Salcedo, Alan B. de Oliveira, and Marcia C. Barbosa (2020). "Water diffusion in rough carbon nanotubes". In: *The Journal of Chemical Physics* 152.2, page 024708.

Fonseca, Tássylla O, Marcia M. Szortyka, **Patricia Ternes**, Cristina Gavazzoni, Alan B. de Oliveira, and Marcia C. Barbosa (2019). "Dewetting in associating lattice gas model confined by hydrophobic walls". In: *SCIENCE CHINA Physics, Mechanics & Astronomy* 62.10, page 107009.

Ternes, Patricia, Evy Salcedo, and Marcia C. Barbosa (2018). "Relation between boundary slip mechanisms and waterlike fluid behavior". In: *Physical Review E* 97.3, page 033104.

Fonseca, Tassylla O, **Patricia Ternes**, and Marcia C. Barbosa (2017). "Freezing suppression in confined water". In: *Physicae Organum* 3.2, pages 128–138.

Ternes, Patricia, Alejandro Mendoza-Coto, and Evy Salcedo (2017). "Single-file mobility of water-like fluid in a generalized Frenkel-Kontorova model". In: *The Journal of chemical physics* 147.3, page 034510.

Others

Tom Albone, Nick Malleson, Alison Heppenstall, Vikki Houlden, **Patricia Ternes** (2021). "Measuring Ambient Populations during COVID-19 in Leeds City Centre". In: *Consumer Data Research Centre*.

A P Neto-Bradley, N Malleson, **P Ternes**, R Choudhary (2021). "Why people in some parts of England pay far more than others to heat their homes". In: *The Conversation*

Under Review

Malleson, Nick, Mark Birkin, Daniel Birks, Jiaqi Ge, Alison Heppenstall, Ed Manley, Josie McCulloch, **Patricia Ternes**. "Agent-Based Modelling for Urban Analytics: State of the Art and Challenges". In: *AI Communications*.

Under Production

A P Neto-Bradley, N Malleson, **P Ternes**, R Choudhary. "Spatial Trends in Energy Efficiency of UK homes".

Patricia Ternes, Robert Clay, Alison Heppenstall, Nick Malleson. "Assimilating realistic data into agent-based models in real-time with a categorical-noise particle filter step".

P Ternes, A P Neto-Bradley, R Choudhary, N Malleson. "A household level synthetic population dataset for estimating energy outcomes in England".

Robert Clay, **Patricia Ternes**, Alison Heppenstall, Nik Lomax. "A Review of Transition Probabilities for Dynamic Microsimulation".

CAMPUS AND INVITED TALKS

Ternes, P & Malleson, N. A high resolution synthetic population for energy demand models. UrbanSys2021. Conference on Complex Systems 2021, Lyon/Fr. October 2021.

Ternes, P & Malleson, N. Applications to real pedestrian traces and gate selection problems with Particle Filters. Towards real-time numerical simulations of human-environment systems: data assimilation & agent-based modelling Workshop. UCL, UK. May 2021.

Ternes, P & Barbosa, M. Slip boundary conditions and the behaviour of nanoconfined water. VIII Workshop in Complexity of Water, Other Liquids and Science Education. UFSC, Brazil. December 2017.

Ternes, P & Torres, E. S. Single-file mobility of waterlike fluid in a generalized Frenkel-Kontorova model. Complex Systems Seminars. UFRGS, Brazil, May 2017.

Ternes, P & Barbosa, M. Flow of a nanoconfined water-like liquid. VII Workshop in Complexity of Water, Other Liquids and Science Education. UFSC, Brazil. November 2016.

Ternes, P & Barbosa, M. Friction in an effective water-wall system. Complex Systems Seminars. UFRGS, Brazil, December 2015.

Ternes, P & Barbosa, M. Slip mechanism for a water-like liquid. VI Workshop in Complexity of Water and Other Liquids. Slip mechanism for a water-like liquid. UFSC, Brazil. November 2015.

Ternes, P & Torres, E. S. Mobility of a water-like fluid in a generalized model. Complex Systems Seminars. UFRGS, Brazil, July 2015.

Ternes, P & Torres, E. S. Mobility of waterlike fluid with a confining potential. V Workshop of Water and Other Complex Liquids. UFSC, Brazil. November 2014.

Ternes, P & Torres, E. S. Mobility analysis of a water-like fluid confined in carbon nanotubes. Complex Systems Seminars. UFRGS, Brazil, September 2014.

ADMIN & SERVICES

2018 - 2019
Commission Member Structuring Teaching Nucleus (NDE)¹ of the Bachelor of Control and Automation Engineering, Federal Institute Catarinense

2018 - 2019
Commission Member Structuring Teaching Nucleus (NDE)¹ of the Bachelor Computational Engineering, Federal Institute Catarinense

2018 - 2019
Commission Member Course Board (CC)² of the Bachelor of Control and Automation Engineering, Federal Institute Catarinense

2018 - 2019
Commission Member Course Board (CC)² of the Bachelor Computational Engineering, Federal Institute Catarinense

2018
Organising committee XI National Interdisciplinary Scientific and Technological Initiation Conference, Brazil (6th-8th November, 2018)

1: A member of the NDE commission is responsible for participating in the process of setting up the course, in addition to continually updating the course project.

2: A member of the CC commission is responsible for participating in decisions on how to implement the course project defined by the NDE commission.

PROFESSIONAL TRAINING

- 2022 - Fundamentals of Accelerated Computing with CUDA Python, NVIDIA Deep Learning Institute.
- 2021 - Time Series Forecasting with Python, AI+ TRAINING.
- 2021 - SWD6: High Performance Python, IT Training, University of Leeds.
- 2021 - SWD2: Version Control with Git / Github, IT Training, University of Leeds.
- 2020 - HPC1: HPC Carpentry, IT Training, IT Training, University of Leeds.
- 2020 - Java Programming: Solving Problems with Software, Duke University.
- 2020 - Java Basic Programming I, II & III, Federal Institute of Rio Grande do Sul.
- 2019 - Creating Educational Videos, Federal Institute of Rio Grande do Sul.
- 2019 - Personalizing Teaching through Active Methodologies, Federal Institute of Rio Grande do Sul.
- 2018 - Use of technologies to support teaching, Federal Institute Catarinense.
- 2015 - Programming in CUDA, Federal University of Rio Grande do Sul.
- 2011 - Initial Training of Tutors for distance education, Federal University of Santa Catarina.

Patricia Ternes

*I hereby certify that all the information provided in this CV is true and correct.
Referees would be available upon your request.*