



Federico Agustín Caccia

Curriculum Vitæ, July 2018

Personal data

Name: *Federico Agustín Caccia*

Date and place of birth: *8th February 1989, Corrientes, Argentina*

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ResearchGate: *www.researchgate.net/profile/Federico_Caccia2*

Education

- 2017 **Master degree in Engineering**, *Balseiro Institute, Cuyo National University and National Atomic Energy Commission, San Carlos de Bariloche, Argentina.*
Thesis: *Multiscale coupling in fluid-dynamic calculations.*
Director: PhD. Enzo A. Dari.
- 2014 **Nuclear Engineer**, *Balseiro Institute, Cuyo National University and National Atomic Energy Commission, San Carlos de Bariloche, Argentina.*
Thesis: *Conceptual Design of a Fast Nuclear Reactor.*
Director: PhD. Eduardo Villarino.
- 2011 **Student in Civil Engineer**, *Facultad de Ciencias Exactas, Ingeniería y Agrimensura, Universidad Nacional de Rosario, Rosario, Argentina.*
Attended the first two years of the career until obtaining the scholarship of degree in Balseiro Institute.

Professional Experience

- 2018 **Programming Engineering and Researcher**, *CoinFabrik*, Buenos Aires, Argentina.
Quantitative analysis: research and code development. Responsibilities and achievements:
- Correlation and cointegration analysis in crypto-currencies.
 - Market neutral pair-trading strategies analysis.
 - Mean reversion algorithms analysis.
- Natural language processing of text documents: research and code development. Responsibilities and achievements:
- Incremental clustering of text documents using vector expansion techniques.
 - Breaking news, tweets and social media articles online clustering.
- 2014–2017 **Nuclear Engineer**, *Computational Mechanics Department in National Atomic Energy Commission*, San Carlos de Bariloche, Argentina.
Basic Engineering Projects for Nuclear Research Reactors.
Development of thermohydraulic calculation codes.
Director: PhD. Enzo A. Dari (darie@cab.cnea.gov.ar), Co-director: PhD. Mariano Cantero (mcantero@cab.cnea.gov.ar).
Responsibilities and achievements:
- Validation of the calculation line for the model of the Second Shutdown System of the RA-10 reactor.
 - Multiscale analysis of the Second Shutdown System of the RA-10 reactor.
 - Fluid dynamics simulations of biphasic flow with the techniques of *volume of fluid* using OpenFOAM and *level-set* using Par-GPFEP.
 - Development of Newton master code for explicit and implicit coupling of calculation programs.
 - Coupling of neutronic codes (PUMA, Fermi) and thermohydraulic codes (RELAP5, Par-GPFEP and other own development codes).
- 2014 **Engineering Consultant**, *SIC-TEC*, Mendoza, Argentina.
Wind load modeling on structures under construction using OpenFOAM.
References: Eng. Eduardo Tano (tano@sic-tec.com.ar).
- 2013–2014 **Undergraduate intern**, *Nuclear Engineering Department in INVAP S.E.*, San Carlos de Bariloche, Argentina.
Nuclear engineering thesis: *Conceptual Design of a Fast Reactor*.
Director: PhD. Eduardo Villarino (men@invap.com.ar).

Teaching experience

- 2016 **Auxiliar teaching ad-honorem**, *Matemática 2A (Mathematics 2A) and Métodos Numéricos (Numerical Methods)*, *Balseiro Institute, Cuyo National University and National Atomic Energy Commission*, San Carlos de Bariloche, Argentina.
References: PhD. Javier Fernandez (jfernand@cab.cnea.gov.ar), PhD. Enzo A. Dari (darie@cab.cnea.gov.ar).

Languages

- Spanish **Native language.**
- English **Fluent (reading, writing). Intermediate (speaking).**
- French **Basic communication skills.** *A1 international certificate, 2015.*

Technical skills

Scientific programming languages

C	Advanced level	C++	Advanced level
CUDA C	Intermediate level	Fortran	Intermediate level
Octave	Intermediate level	Python	Advanced level
Scripting	Intermediate level		

Back-end programming

MySQL	Basic level	PHP	Basic level
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Front-end programming

CSS	Intermediate level	HTML	Intermediate level
Javascript	Basic level	Markdown	Basic level

Android programming

Kivy	Intermediate level	Unity 3D	Basic level
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Other

- Operating systems: Debian GNU/Linux, Microsoft Windows
- Scientific libraries: cuRAND, GNU Scientific Library (GSL), Matplotlib, NumPy, OpenMP, OpenMPI, Pandas, PETSc, PyBrain, PyFoam, SLEPc, ScyPy, Scikit-learn, Thrust
- Scientific software: GNU Project Debugger (GDB), Gmsh, Gnuplot, Mathematica, MATLAB, OpenFOAM, Origin, Paraview, SALOME
- Technical and scientific documentation: Latex, Microsoft Office
- Version control software systems: Git, Mercurial

Grants and fellowships

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| 2017 | Scholarship to attend <i>Latin American Summer School in Computational Neuroscience LACONEU 2017</i> . |
| 2014–present | Professional perfectioning grant <i>A1P</i> from the National Atomic Energy Commission to work in Computational Mechanics Department. |
| 2011–2014 | Scholarship from the National Atomic Energy Commission to study Nuclear Engineering at the Balseiro Institute. |

Specialization courses

Courses taken during Masters:

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| 2016 | <i>Modeling of thermohydraulic systems in reactors using plant codes</i> – Professor: PhD. Pablo Zanocco, 80 hs, Balseiro Institute, Cuyo National University and National Atomic Energy Commission, San Carlos de Bariloche, Argentina. |
| 2015 | <i>Introduction to computing with GPUs</i> , Professor: PhD. Flavio D. Colavecchia, 64 hs, Balseiro Institute, Cuyo National University and National Atomic Energy Commission, San Carlos de Bariloche, Argentina. |

- 2015 *Introduction to distributed processing*, Professor: PhD. Enzo A. Dari, 60 hs, Balseiro Institute, Cuyo National University and National Atomic Energy Commission, San Carlos de Bariloche, Argentina.
- 2015 *Neural Networks*, Professor: PhD. Germán Mato, 128 hs, Balseiro Institute, Cuyo National University and National Atomic Energy Commission, San Carlos de Bariloche, Argentina.
- 2014 *Finite element method*, Professor: PhD. Enzo Dari, 120 hs, Balseiro Institute, Cuyo National University and National Atomic Energy Commission, San Carlos de Bariloche, Argentina.
- 2014 *Numerical methods in fluid mechanics*, Professor: PhD. Federico Teruel, 80 hs, Balseiro Institute, Cuyo National University and National Atomic Energy Commission, San Carlos de Bariloche, Argentina.
- 2013 *Reactor analysis and calculation*, Professor: PhD. Edmundo Lopasso, 80 hs, Balseiro Institute, Cuyo National University and National Atomic Energy Commission, San Carlos de Bariloche, Argentina.

Other courses

- 2018 *Deep learning with tensorflow*, Online course taken at cognitiveclass.ai, an IBM initiative. Authenticity of this certificate can be validated by going to: <https://courses.cognitiveclass.ai/certificates/1e4b7f8f9b9c4258927b7e663f3165b5>
- 2018 *Deep learning with tensorflow*, Online course taken at cognitiveclass.ai, an IBM initiative. Authenticity of this certificate can be validated by going to: <https://courses.cognitiveclass.ai/certificates/3043c010ae9745818c7917e771f79954>

Publications

Technical Reports at National Atomic Energy Commission

- 2015 *Hydrodynamic analysis of the Second Shutdown System of the RA-10 reactor*, Ludmila M. Rechiman, Mariano Cantero, Enzo A. Dari, Federico A. Caccia and Andrés Chacoma, Technical Report CNEA IN-ATN40MC-04/2015, San Carlos de Bariloche, Argentina.

Publications in international journals

- 2017 *Three-dimensional hydrodynamic modeling of the Second Shutdown System of an experimental nuclear reactor*, Ludmila M. Rechiman, Mariano Cantero, Federico A. Caccia, Andrés Chacoma and Enzo A. Dari, Nuclear Engineering and Design, vol 319, pp 163-175, doi: 10.1016/j.nucengdes.2017.04.024.

Presentations at congresses with publication in acts:

- 2016 *Multiscale coupling in fluid-dynamic calculations*, Federico A. Caccia and Enzo A. Dari, XXII Congress on Numerical Methods and its Applications ENIEF 2016, National Technological University, Córdoba, Argentina. Published in *Mecánica Computacional* Vol XXXIV, págs. 1955-1972.

- 2016 *Validation of a multiscale model of the second shutdown system of an experimental nuclear reactor*, Ludmila M. Rechiman, Mariano Cantero, Federico A. Caccia and Enzo A. Dari, XXII Congress on Numerical Methods and its Applications ENIEF 2016, National Technological University, Córdoba, Argentina. Published in *Mecánica Computacional* Vol XXXIV, págs. 2199-2215.

Conferences and courses attended:

- 2017 *Evolution of neural computation*, Balseiro Institute, Cuyo National University and National Atomic Energy Commission, San Carlos de Bariloche, Argentina.
- 2017 *Latin American Summer School in Computational Neuroscience LACONEU 2017*, Project: *Sensory adaptation without plasticity in the V1 visual cortex*, Institute of Complex Systems of Valparaíso, Valparaíso, Chile.
- 2017 *Computational Neuroscience: new trends and challenges for the 2030*, Institute of Complex Systems of Valparaíso, Valparaíso, Chile.
- 2016 *Machine Learning*, Balseiro Institute, Cuyo National University and National Atomic Energy Commission, San Carlos de Bariloche, Argentina.
- 2016 *XXII Congress on Numerical Methods and its Applications ENIEF 2016*, National Technological University, Córdoba, Argentina.
- 2015 *Plasma processing of radioactive wastes: process engineering, flue gas and solid wastes*, organized by the Nuclear Material Department, the National Program of Radioactive Waste Management and the International Atomic Energy Agency, Bariloche Atomic Center, San Carlos de Bariloche, Argentina.
- 2014 *XXI Congress on Numerical Methods and its Applications ENIEF 2014*, Bariloche Atomic Center, San Carlos de Bariloche, Argentina.

Software development

- Online trending detection** Online trending detection is a natural language processing code that performs incremental clustering over news, tweets and other social media articles.
- Newton** Newton is a master code that solves explicit and implicit coupling in nonlinear calculations, for example, in fluid-dynamic, neutronic and termohydraulic coupling, etc. (www.github.com/fedecaccia/newton).
- Par-GPFEP** Par-GPFEP is a general purpose finite element program designed to solve mechanic problems involving multiphase flows, turbulent models, free-surface tracking, heat transfer, fluid-structure interaction and others.

Federico Agustín Caccia
July 8, 2018