Federico Agustín Caccia

Curriculum Vitæ, August 2017

Personal data

Name: *Federico Agustín Caccia*

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

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Linkedin: `www.linkedin.com/in/fedecaccia`

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

2014–present **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).
- Version control implementation (Git) for computational codes and technical documentation.

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 (Matemathics 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 **Speaks, reads and writes fluently.**

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`	Advanced level	`Python`	Advanced level
`Scripting`	Intermediate level		

Back-end programming

`MySQL`	Basic level	`PHP`	Basic level

Front-end programming

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

Android programming

`Kivy`	Intermediate level	`Unity 3D`	Basic level

Other

- Operating systems: Debian GNU/Linux, Microsoft Windows
- Scientific libraries: cuRAND, GNU Scientific Library (GSL), Matplotlib, NumPy, OpenMP, OpenMPI, PETSc, PyBrain, PyFoam, SLEPc, ScyPy, 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

2017 Scolarship to attend *Latin American Summer School in Computational Neuroscience LACONEU 2017*.

2014–present Professional perfectioning grant *A1P* 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:

2016 *Modeling of thermohydraulic systems in reactors using plant codes* – Professor: PhD. Pablo Zanocco, 80 hs, Balseiro Institute, Cuyo National University and National Atomic Energy Commission, San Carlos de Bariloche, Argentina.

2015 *Introduction to computing with GPUs*, 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.

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- 03/2015, 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 Technologycal 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 Technologycal 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 Technologycal 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

`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
August 26, 2017