

# CURRICULUM VITAE

## PERSONAL DATA:

Surname: **Varone**

Forename: Alberto

Place and date of birth: Cagliari, 17 June 1966

Nationality: Italian

E-mail address: alberto@crs4.it



## INTERESTS:

Dr Varone earned his undergraduate *Laurea* degree and his Ph.D. in Theoretical Physics from University of Cagliari (IT) and has worked in the field of renewable energies in the last twenty years. Presently engaged in fundamental energy and environmental research both from the theoretical and experimental perspectives.

As a Senior Scientist leads the *Recovery of CO<sub>2</sub> for the production of methane* research Programme at CRS4, the aim of the project is to produce technical and economical assessments of relevant technologies for sustainable fuels production from renewable energies and captured CO<sub>2</sub>.

In collaboration with research groups from University of Cagliari and Sardegna Ricerche in the framework of the Regional Renewable Energy Platform is involved in R&D project on smart energy systems including bio-methane production from residuals and wastes

As a Senior Scientist at IASS he led the *Recovery of CO<sub>2</sub> for the production of methanol* Research Programme; the aim of the research project was to produce technical and economical assessments of relevant technologies for sustainable fuels production from renewable energies and captured CO<sub>2</sub>.

The Earth, Energy and Environment - (E<sup>3</sup>) Cluster, under the responsibility of the IASS Scientific Director, Prof. Carlo Rubbia, is exploring new scientific and technological approaches to transform the current energy technologies, based mainly on the combustion of fossil fuels, into sustainable and climate-friendly solutions. In the trans disciplinary approach to sustainability vision of IASS, the research activity is also oriented to the production and release of technical assessments for policy makers acting in the regulatory framework.

## EDUCATION:

1996 Ph.D. in Physics, *Chaos in Infinite dimensions*, joint research project between the Physics Department of the University of Cagliari and the INO (Istituto Nazionale di Ottica) Firenze.

1992 Degree cum Laude in Physics, *Chaos in real engineering system*, University of Cagliari.

## **ADDITIONAL TRAINING:**

2002 Marie Curie Fellowship, Researcher at the Institut für Verfahrenstechnik (Process engineering), TU Berlin

## **LANGUAGES:**

Italian: Mother tongue  
English: Good in speaking, reading and writing  
French: Good in speaking, reading and writing  
German: B2 level in reading and writing

## **WORK EXPERIENCE**

2016-

Senior Scientist at CRS4 – CRS4, Centre for Advanced Studies Research, and Development in Sardinia  
Leader of Sustainable Fuels research project

2011-2015

Senior Scientist at IASS – Institute for Advanced Sustainability Studies – Potsdam

Working on Advanced Research on Sustainable Energies

New research lines establishment, staff recruitment and contracts definitions in the field of sustainable renewable energies systems under the direction of the Nobel Laureate Prof. Rubbia - E<sup>3</sup> Cluster (Energy, Earth, Environment)

- Long-distance energy transport through superconducting electric lines
- Advanced concepts of concentrating solar energy systems
- Combustion of methane without CO<sub>2</sub> emission
- Recovery of CO<sub>2</sub> for the production of methanol
- Properties of methane clathrates, Role and potential of unconventional gas

Leader of the *Recovery of CO<sub>2</sub> for the production of methanol* research program; the aim of the research project is to produce technical and economical assessments of relevant technologies for sustainable fuels production from renewable energies and captured CO<sub>2</sub>.

2007-2010

Research Leader of the Solar Energy Technologies Group at CRS4, Centre for Advanced Studies Research, and Development in Sardinia

Working on Applied research on Energy, Environmental Sciences, Life Sciences, and Information society.

Conducting research activities in solar technologies under the direction of the Nobel laureate Prof. Rubbia

- Developing new models in the field of solar trough technology and heat storage
- Working on industrial contracts
- Writing national and international proposal
- Working on national and international projects
- Writing papers and technical reports

### 2005-2010

Senior Researcher and Research Leader of the Solar Energy Technologies Group at CRS4, Centre for Advanced Studies Research, and Development in Sardinia

Working on Applied research on Energy, Environmental Sciences, Life Sciences, and Information society.

Conducting research activities in solar technologies under the direction of the Nobel laureate Prof. Rubbia

- Developing new models in the field of solar trough technology and heat storage
- Working on industrial contracts
- Writing national and international proposal
- Working on national and international projects
- Writing papers and technical reports

### 2003-2004

Expert researcher in the Fluid Dynamics Group at CRS4, Centre for Advanced Studies Research, and Development in Sardinia

Working on Applied research on Energy, Environmental Sciences, Life Sciences, and Information society.

Conducting research activities in solar technologies under the direction of the Nobel laureate Prof. Rubbia

- Conducting research activities in fluid dynamics and turbulence modelling
- Developing PDF (Probability Density Function) stochastic models for transport equations
- Working on industrial contracts;
- Working on national and international projects
- Writing papers and technical reports

## 1996-2001

Researcher in the Applied Mathematics Group at CRS4, Centre for Advanced Studies Research, and Development in Sardinia

Working on Applied research on Energy, Environmental Sciences, Life Sciences, and Information society.

Conducting research activities in solar technologies under the direction of the Nobel laureate Prof. Rubbia

- Conducting research activities in fluid dynamics and turbulence modelling
- Development of an integrated Fluid dynamics and Monte Carlo software for fission fragment rocket propulsion code
- Development of fluid dynamics Navier-Stokes code for vascular simulation
- Working on national and international projects
- Writing papers and technical reports

## **TEACHING EXPERIENCES**

Liceo Scientifico "Michelangelo" – Cagliari

Adjunct professor Mathematic and Physics - 1991-1993

Liceo Scientifico "Pacinotti" – Cagliari

Adjunct professor Mathematic and Physics -1994

University of Cagliari – Cagliari

Physic Department

Adjunct professor - Condensed matter physics -1995 -1996

## **OTHER QUALIFICATIONS**

Design and recruitment of research team

Leading research groups

Evaluator for international projects

International Workshops and Conferences organization

## **COMPUTER SKILLS AND COMPETENCES**

Commercial CFD packages:

ANSYS Fluent and Star-CD

Chemical Process design:

ASPEN

Technical computing:

Mathematica

Solar plant design:

SAM (Solar Advisor Model), TRNSYS

Programming languages:

F77/F90 and C++

Operative systems:

Unix, Linux and Windows

## SELECTED PUBLICATIONS

- A. Varone**, A. Politi, and M. Ciofini, *CO<sub>2</sub> laser dynamics with feedback*, Phys. Rev. A 52, 3176–3182 (1995)
- G. Santoboni, **A. Varone** and S.R. Bishop, *Spatial distribution of chaotic transients in unidirectional synchronization*, Physics letters A, 257(3-4), 1999, pp. 175 – 181.
- A. Varone**, G. Santoboni and S.R. Bishop, *Transient time in unidirectional synchronization*, International Journal of Bifurcation and Chaos, 9(12), 1999, pp. 2345 - 2352
- G. Abdoulaev, **A. Varone** et al. *ViVa: The Virtual Vascular Project*, IEEE Transactions on Information Technology in Biomedicine, 22(4): 268-274, December 1998.
- A. Varone** et al. *Agglomeration in PRATSOLIS Project*, 8th conference "Multiphase flow in industrial plants", Alba (Italy), September 18-20, 2002
- A. Varone** et al. *Pre-feasibility study: Renewable Energy Sources to meet energy demand of Sardinian water supply services*, CRS4 Tech. Rep. 2008.
- A. Varone** and L. Massidda. *Numerical analysis of an high temperature solar collecting tube using gas as a heat transfer fluid*. 14<sup>th</sup> International Symposium on Concentrating Solar Power, Las Vegas 2008.
- A. Varone** et al. *The construction of a 50 MW solar thermal power plant based on parabolic trough technology in Sardinia: pre-feasibility study*, CRS4 Tech. Rep. 2009.
- A. Varone**, P. Pili and G. Murgia. *A Thermocline Two Phase, Solar Heat Storage Tank. Modeling. Parametric Analysis and Design For A Real Case*, 15<sup>th</sup> International Symposium on Concentrating Solar Power. Perpignan 2010.
- A. Varone** et al, *Sustainable Synthetic Fuels*, IASS Fact Sheet 1/2014, <http://ftp02.iass-potsdam.de/publications/epaper/epaper-Factsheet-E3/index.html>
- A. Varone** et al., *Sustainable Fuels from Renewable Energies*, IASS Workshop Report, 2013, [http://www.iass-potsdam.de/sites/default/files/files/workshop\\_report\\_sustainable\\_fuels\\_3.pdf](http://www.iass-potsdam.de/sites/default/files/files/workshop_report_sustainable_fuels_3.pdf)
- A. Varone** and M. Ferrari, *Power to Liquid and Power to Gas: an option for the German Energiewende*, Renewable and Sustainable Energy Reviews **45**, (2015), 207–218