

PERSONAL INFORMATION

Tonio PINNA



✉ tonio.pinna@enea.it



Sex Male | Date of birth | Nationality Italian

OB APPLIED FOR  
POSITION  
PREFERRED JOB  
STUDIES APPLIED FOR

Conferimento di un incarico a titolo gratuito all'ing./dr.Tonio PINNA avente ad oggetto: “Studio e consulenza per analisi di sicurezza ed affidabilità per impianti nucleari a fusione

WORK EXPERIENCE

Since Nov 1993 up  
30/11/2023

First Researcher

ENEA Frascati Research Centre – Fusion Division

Via E. Fermi, 45 - 00044 Frascati (Rome), Italy

[www.enea.it](http://www.enea.it)

<http://fus-se.frascati.enea.it/>

- Safety and RAMI Analyses

Business or sector: Nuclear Fusion

The 28/01/2020 appointed as effective member of the Technical Advisory Panel of Fusion for Energy.

The 11/12/2018 appointed as responsible of the Safety analyses in the task force for plant authorization and licensing of DTT plant, according “Artt. 27 and 28 del D.Lgs 230/95 e s.m.i.”.

The 11/12/2017 appointed as effective member of the ENEA patent commission with the task of proposing, evaluating and deciding on the application for patents developed within the research body. Now vice-president of the commission.

Since 02/11/1993 (29 years of experience) working on Safety and reliability, availability, maintainability, inspectability (RAMI) analyses for fusion facilities, often, with function of project manager for ENEA. Currently, coordinator of RAMI activities for the “DEMO Oriented Neutron Source” (DONES) and main analyst of DEMO RAMI studies carried out in the frame of the Eurofusion Working Programmes, as well as coordinator of the ENEA activities on Safety for DEMO. Reference person and task owner for the RAMI and Safety of the Tritium Fuel and Vacuum (TFV) work package.

Co-ordinator in the 2021 of the safety analysis carried out for DTT and now responsible officer.

Some of the activities performed in the 29 years of work in “Nuclear Fusion” are listed below:

- Failure Mode and Effect Analysis (FMEA) and RAMI studies for DEMO systems, e.g. breeding blankets, heat transfer systems, balance of plant, Tritium Fueling and Vacuum, Heating and Current Drive systems.
- Functional Analysis, FMEA, Hazard and Operability (HAZOP) study, RAMI analyses, issuing of the safety report and design of the control system for the preliminary design of the Water Detritiation System of the International Tokamak Experimental Reactor (ITER).
- Functional FMEA of the DTT plant with first identification of safety issues for the plant.
- HAZOP studies and RAMI analyses for the atmosphere detritiation systems of the ITER plant, i.e.: Tokamak Complex, Hot Cell and Glove Box Detritiation Systems. Activities performed through ITER and F4E (Fusion For Energy - European Joint Undertaking for ITER and the Development of Fusion Energy) Contracts. The HAZOP meetings organized and performed as Team Leader. Development of a dedicated software tool to assist analysts in the HAZOP studies.
- Safety and RAMI analysis for the Radial Neutron Camera of ITER.
- HAZOP studies for the Biomass Power Plant of Widmerpool at Nottingham (England), the Biomass Power Generation Plant of Finale Emilia (Italy), for the combined Geothermic and Biomass Power Generation Plant Cornia 2 of Larderello (Italy), for the existing Cogeneration Plant with methane gas engines and turbines of Trigno Energy srl., for the new biomass thermal power plant of S. Agata di Puglia (Italy). Activities performed in the role of HAZOP Leader as consultant for the TECHNO S.r.l.
- Collection and detailed analysis of data related to operating experience gained in fusion laboratories. Particularly, at JET, TLK and ASDEX for failures of components and systems, at TFTR and DIII-D for occupational radiation exposure (ORE), at JET for the Beryllium handling and maintenance operations on components with beryllium compounds.
- Development of the “Fusion Component Failure Rate Database”.
- Safety and RAMI analyses for the International Fusion Materials Irradiation Facility (IFMIF) systems and for DONES.
- Identification of Safety Important Classified (SIC) components and Operating Limits and Conditions (OLC) for all the systems of ITER plant (ITER Contract), future DEMO power plant and the IFMIF facility.
- First version of the Preliminary Safety Report for the HCLL and HCPB TBMs of ITER.
- Setting of RAMI guidelines for Demonstration (DEMO) fusion power plant and identification of availability targets for specific systems.
- Accident sequences identification, probabilistic safety assessment and check of design solutions for ITER systems (European Fusion Development Agreement - EFDA tasks and contracts since years 1996 up to 2007). Last works were related to the failure mode and effect analysis (FMEA) studies for all the ITER systems including the European Test Blanket Modules (TBMs) (years 2005-2007). Development of a dedicated software tool to assist analysts in the FMEA studies.
- Occupational Radiation Exposure (ORE) assessments for ITER, Power Plant Conceptual Studies (PPCS), DEMO and IFMIF. On this purpose, development of a dedicated software tool to analyze and collect data on ORE.
- Studies on “Accident during maintenance”, “Post accident recovery actions” and “Concerns on tritium confinement and atmosphere detritiation systems” for ITER.
- Drawing up of the Preliminary Safety Report of IFMIF.
- Deterministic evaluation of accident sequences by the use of computer codes and engineering evaluations.
- Validation of computer codes used in accident analysis.

Jan. 1991- Oct. 1993

## Researcher

ENEA Casaccia Research Centre – New Technology Division

Via Anguillarese, 301 - 00123 S.Maria di Galeria (Rome), Italy

[www.enea.it](http://www.enea.it)

- Research in CAD and New Technologies

**Business or sector:** New Technologies R&D

- Development of CAD (Computer Aided Design) applications for plant automation and robotics.
- Promotion of European research programs towards Italian industries

**May 1985 – Dec. 1990**

## Researcher

ENEA Casaccia Research Centre – New Technology Division

Via Anguillarese, 301 - 00123 S.Maria di Galeria (Rome), Italy

[www.enea.it](http://www.enea.it)

- Research in Nuclear Fuel Cycle and Radioactive Waste Management

**Business or sector:** Fuel Cycle for nuclear power reactors

Project activities in design and construction of plant facilities for treatment and conditioning of solid and liquid radioactive waste, which were produced in ENEA experimental plants and laboratories dedicated to the R&D on nuclear fuel cycle. Particularly:

- Design of a storage facility for liquid high level radioactive waste in the EUREX plant.
- Design of a transportation tank for liquid high level radioactive waste.
- Design of facilities for treatment and conditioning of solid radioactive waste (cementation, super compacting, incineration, etc).
- Development of a database to record and analyse data for the radioactive waste management in the different ENEA sites.
- Quality Assurance in managing complex projects.

**Jan. 1985 – May 1985**

## Industrial Engineer

Colgate Palmolive S.p.A.

Viale Palmolive, 18, 00042 Anzio (Rome), Italy

- Plant organization management

**Business or sector:** Chemical Industry

Employed in the industrial engineer service of the Colgate Palmolive S.p.A. factory to perform activities in the field of development of automation techniques in the manufacturing of products and of optimization of hands-on manufacturing procedures.

**Mar 1983 – Aug 1984**

## Lieutenant in the Army Technical Force

Italian Army Technical Force

Piazzale degli Eroi, 1 - 00048 Nettuno (Rome) , Italy

- Test and analysis of trial data

**Business or sector:** Test of weapons and ammunitions

Engineer in charge for checking and testing activities on weapons and ammunitions produced by the Italian industries and on weapons and ammunitions supplied to the Italian Armies.

## EDUCATION AND TRAINING

- 15 December 1982** **University Degree in Mechanical Engineering**  
At the University of Rome “La Sapienza”, Italy  
Skills acquired: Mechanical Engineer
- 20-24 February 2017** **Training in availability and maintainability analyses**  
Course on: Reliability and Maintainability Analysis for Repairable Systems  
Organized by ReliaSoft  
Rome, Italy  
Skills acquired: Reliability engineering concepts, methods and software tools applied for repairable systems analysis and maintenance planning.
- 26-30 October 2015** **“TÜV Rheinland Functional Safety Program – Safety Instrumented Systems**  
Course and qualification examination – on Safety Instrumented Systems as defined by IEC 61508 / IEC 61511  
Organized by CTAI S.r.l. for TÜV Rheinland  
Held in Milan, Italy  
Skills acquired: Capability in functional safety management, with particular reference to the design of safety instrumented systems and related devices. SIL (Safety Integrity Level) assessment.
- 17-21 February 2014** **Training in reliability, availability, maintainability, inspectability (RAMI) analysis and Life Data analysis**  
Course on: Advanced system reliability/maintainability analysis and Life Data analysis  
Organized by ReliaSoft  
Held in Modena, Italy  
Skills acquired: Capability to perform RAMI analysis and Life Data analysis by the use of Weibull++, Alta and BlockSim software codes
- 16-19 November 2010** **Training in leading Hazard And Operability (HAZOP) studies**  
Course on: HAZOP study for team leaders and team members as a team leader  
Organized by Institution of Chemical Engineers  
Held at The University of Manchester, UK  
Skills acquired: Capability to organize and lead HAZOP studies
- 1-3 March 2010** **Training in reliability, availability, maintainability, inspectability (RAMI) analysis**  
Course on: Advanced system reliability/maintainability analysis  
Organized by ReliaSoft  
Held in Berlin, Germany  
Skills acquired: Capability to perform RAMI analysis by the use of the BlockSim software code
- 8-10 February 2010** **Training in reliability, availability, maintainability, inspectability (RAMI) analysis**  
Course on: Reliability engineering & life data analysis  
Organized by ReliaSoft  
Held in Berlin, Germany  
Skills acquired: Capability to perform RAMI analysis and analyse data on component and system failures
- 8-11 November 1999** **The Guide Word approach to HAZOP (Hazard And Operability studies**  
Course on: HAZOP study

Organized by IBC Global Conference Limited  
 Held in London, UK  
 Skills acquired: Capability to organize and perform HAZOP studies

**10-21 July 1995**

**Training in safety analyses for nuclear power reactors**

Course on: Summer professional School on Nuclear Power Reactor Safety : Parts I and II.  
 Organized by MIT - Massachusetts Institute of Technology (Boston – USA)  
 Held at MIT, Boston, USA  
 Skills acquired: Techniques and methodologies for safety analyses on nuclear power reactors

**18-20 October 1988**

**Training in Quality Assurance (QA)**

Course on: Quality Assurance on software development  
 Organized by AICQ - ANGQ Associazione Nazionale  
 Held in Bologna, Italy  
 Skills acquired: Techniques and methodologies to develop software codes according a QA program

**23-25 June 1987**

**Training in Quality Assurance (QA)**

Course on: Computer support on Quality Assurance  
 Organized by Quality Assurance: SGQ-Societa` per la Gestione della Qualita`  
 Held in Cologno Monzese, Italy  
 Skills acquired: Techniques and methodologies to apply a QA program

**March 1987**

**Training in vectorial computing**

Course on: Software development for vectorial computing with IBM 3090  
 Organized by CNUCE - Istituto del Consiglio Nazionale Delle Ricerche  
 Held in Pisa, Italy  
 Skills acquired: Techniques and methodologies to develop software codes by vectorial computing

**June 1986**

**Training in software development for database applications**

Course on: ADABAS language for database development  
 Organized by SELESTA S.p.A.  
 Held in Rome, Italy  
 Skills acquired: ADABAS language for database development

**PERSONAL SKILLS**

**Mother tongue**

Italian

**Other languages**

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
	English	B2	C2	B2	
French	-	A1	-	-	-

**Communication skills**

- Good communication skills gained through relationship with research institutes, universities and private companies and through sport activities practiced as trainer and player

**Organisational / managerial skills**

- Organisation of research activities to be performed in co-operation with research Institutes, Universities and Companies. Skill acquired working at ENEA.
- Definition and managing of contracts with European Community and Italian universities, laboratories and companies for the ENEA research activities.
- Organisation of manufacturing procedures. Skill specifically acquired working at the Colgate Palmolive S.p.A.
- Organisation of test campaign. Skill acquired in the Italian Army Technical Force

**Job-related skills**

- Good know-how in safety and RAMI analyses techniques and methodologies

**Computer skills**

- Good command of Microsoft Office™ tools including development of Visual Basic Macros for Office products
- Good command of BlockSim™ tool for RAMI analyses, Weibull++ and ALTA

**Other skills**

- Black belt in karate, III DAN and trainer of karate
- Postural gymnastics instructor
- Urban Trekking Volunteer Guide
- Trainer of volleyball teams in the years 1985 -1990
- Trainer of a softball team in the years 1981 – 1984
- Baseball player in the years 1978 – 1980
- Volleyball player in the years 1975 - 1986

**Driving licence**

- Category B

 ADDITIONAL INFORMATION
 

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**Publications**

- More than 80 Publications in the fields of Nuclear Safety for Fusion Devices, RAMI analyses, Data collection and analysis of plant operating experiences, Identification of safety relevant components (see attached list).

**Presentations**

- Invited talk at the “14th International Symposium on Fusion Nuclear Technology” held in Budapest, Hungary. Subject of the talk: Approach on improving reliability of DEMO technical solutions
- Invited talk at the “7th Accelerator Reliability Workshop, ARW 2019” held in Guangzhou, China. Subject of the talk: RAMI analyses for the IFMIF-DONES facility
- Invited talk at the “2019 Prencia User Group Meeting” held in Paris, France. Subject of the talk: Reliability of Technical Solutions for a Nuclear Fusion Reactor
- Invited talk at the ARIES-APEC, Accelerator Performance and Concept Workshop, held in Frankfurt (Germany) in Dec. 2018. Subject of the talk: “Experience of establishing a reliability programme in the fusion community”
- Invited talk at the 26th European Fusion Programme Workshop held in Bad Dürkheim (Germany) in Nov. 2018. Subject of the talk: “Probabilistic evaluation of safety and RAMI concerns for the different blanket models of DEMO reactor”
- Seminar at the University of Pisa on Safety in nuclear fusion plant, 2016

- Seminar at the University La Sapienza of Rome on Safety in nuclear fusion plant, 2016 and 2015
- Lesson held at the “PQM-NET IST-2 Training Course, Budapest, 2015” on RAMI analyses in Fusion
- Lessons held at the University of Tor Vergata for the Master on “Fusion Energy – Science & Engineering” in the 2013 and 2014. Argument of the lessons: Probabilistic Safety Assessment and HAZOP analyses.
- Lessons held to the Karlsruhe International School on Fusion Technologies on safety analyses (2008 and 2009).
- Lessons held at the University of Tor Vergata for the Master on “Protection from Chemical, Biological, Radiological and Nuclear events” in the 2010. Subject of the lessons: Risk Assessment, Risk evaluation, Risk Communication
- Speech at the “International Workshop on Reliability Engineering in Scientific Installations” held in Madrid in the 2012. Presented argument: ENEA experience in ITER RAMI
  
- Oral presentations at the “International Conference on Probabilistic, Safety Assessment and Management – PSAM11” held at Helsinki (Finland) in the 2012. Subject of the talk: “Outlines of RAMI Guidelines for DEMO Systems”
- Speech at the “IAEA - National Workshop on Tritium Management” held in Valcea (Romania) in the 2012. Subject of the talk: “Tritium Handling – Hazard Control”
- Invited talk at the “9th International Symposium on Fusion Nuclear Technology” held in Dalian (China) in the 2009. Subject of the talk: Operating experiences from existing fusion facilities in view of ITER safety and reliability
- Speech at the “8th IAEA Technical Meeting on Fusion Power Plant Safety” held in Vienna (Austria) in the 2006. Subject of the talk: “Collection and analysis of component failure data from JET systems”.
- Oral presentations at the “International Conference on Probabilistic, Safety Assessment and Management – PSAM5” held at Osaka (Japan) in the 2000. Subject of the talk: “Selection of accident sequences for the new design of ITER”.
- Oral presentations at the “International Conference on Probabilistic, Safety Assessment and Management – PSAM4” held at New York (USA) in the 1998. Argument presented: “Extensive use of an Event Tree model to define the reference accident sequences for ITER plant”.
- Speech at the “3rd IAEA Technical Meeting on Fusion Power Plant Safety” held in Naka (Japan) in the 1996. Subject of the talk: “Multiple failure accident sequences for SEAFP reactor”.

#### Conferences

- Participation to 26 conferences in the field of Nuclear Fusion and Probabilistic Safety Assessment. Co-Author of works presented in more than 40 conferences.

#### Memberships

- European Task Member of the “International Energy Agency Agreement on the Environmental, Safety and Economic Aspects of Fusion Power (IEA ESE)” – Task 5

The undersigned declares in faith that the above is true in accordance with the law, and authorizes the processing of the personal data above.

Rome, 01/12/2023

In faith