



EUROPEAN CURRICULUM VITAE

PERSONAL INFORMATION



PHD MICHELE CALABRETTA

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 michele.calabretta@st.com

Sex Male | Date of birth 11/09/1981 | Nationality Italian

Status Married

WORK EXPERIENCE

- Dates (from – to)
- Name and address of employer
- Type of business or sector
- Occupation or position held
- Main activities and responsibilities

06/2021 – Now

STMicreoelectronics S.r.l., Stradale Primosole 50,95121 Catania (CT), Italy

Power Electronics, R&D

Power & Discrete R&D, Technology Reliability Physics Director

Member of the ST QMT (Quality, Manufacturing & Technology) R&D Board. Responsible for Technology Qualification Reliability Physics. In charge for Reliability investigation and analysis on Power Devices (Discrete and Modules) for Automotive Applications. Responsible for both the R&D Advanced Reliability and Physical Analysis Laboratories. The Advanced Reliability Laboratory (team made by 8 Engineers and physics) is focused on Reliability assessments (Thermal-Cycling, Shocks, Environmental Sequences, High Temperature Biased tests (HTRB,HTGB, H3TRB and Dynamic Tests with high slew rate) and material characterization. The scope of the R&D Physical Lab (team made by 7 Physics) is linked to physical characterization by means of non-destructive (SAM,optical microscopy) and destructive investigation (sample preparation by mechanical and Ion milling, SEM, TEM). Aim of the activity is to characterize the device degradation and the related failure mechanisms under reliability test conditions and in the final mission profile reliability (mainly at traction inverter level). Building-up of multi-physics models (from TCAD to final electrical model, considering thermal and structural interaction) to describe the stressing applicative conditions and their impact in terms of reliability degradation. Responsible for the R&D interaction with University of Catania and member of the Organizing Committee for the Master in Power Electronics. Representative member of ST within ECPPE Organization.

- Dates (from – to)
 - 12/2013 – 06/2021**
 - Name and address of employer
 - STMicroelectronics S.r.l., Stradale Primosole 50,95121Catania (CT), Italy
 - Type of business or sector
 - Power Electronics, R&D
 - Occupation or position held
 - Advanced Simulation and Characterization Manager
 - Main activities and responsibilities
 - Responsible for creation and development of the “Advanced Simulation and Characterization Team” within the Automotive & Discrete Group (ADG). Building-up of thermo-mechanical simulation models and creation of a team for Power devices design and optimization through simulation and material characterization (mainly focusing on Back-End aspects, both on discrete and Power Module, and on frontback metallization/passivations).
 - Responsible for mechanical/tribological characterization activities related to new metallurgic joint development (diffusion soldering, sintering, Cu metallization), Front-End/Back-End interfaces for high temperature/improved fatigue applications and for activity related to innovative compounds (SiC, GaN) and new technology development (thin wafers).
 - Responsible for “R&D Advanced Reliability Lab”, in charge for reliability assessment at R&D level (Power Cycling, Thermal Cycles/Thermal Shocks and High Temperature/Humidity die related biased tests) and for all relevant failure mechanism modeling enabling the Mission Profile Reliability definition and verification.
 - Responsible for “R&D Physical Lab” for physical investigation on new technology and process debug and for failure analysis investigation in reliability and applicative testing conditions. Research affiliation at CNR-IMM (Italian National Council for the Research, Institute for Microelectronics and Microsystems) as industrial researcher fellow for Power Electronics Packages characterization and reliability. Representative for STMicroelectronics and team member at ECPE (European Center for Power Electronics) for AQG324 Specification for “Qualification of Power Modules for Use in Power Electronics Converter Units (PCUs) in Motor Vehicles”.
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- Dates (from – to)
 - 06/2011 – 12/2013**
 - Name and address of employer
 - STMicroelectronics S.r.l., Stradale Primosole 50,95121Catania (CT), Italy
 - Type of business or sector
 - Power Electronics, R&D
 - Occupation or position held
 - Senior Packaging Engineer
 - Main activities and responsibilities
 - PE&D (Packaging Engineering and Development) process engineer responsible for Through-Hole Packaging Engineering. Technical monitoring of maturity level milestones for Packaging Qualification up to mass production release. Process definition and optimization on innovative die-attach (AuSn and CuSn diffusion soldering, Innot alloy and hybrid glue), top side interconnections studies (Al clad, clip attach), substrates characterization (AMB and DBC) and molding compound thermo-mechanical characterization (DMA, TMA, TGA) and optimization for discrete and module packaging (potted and molded). Development of characterization methodology (both experimental and simulation tools) for packaging reliability optimization. Responsible for “Golden Flow Optimization” for the PTD “Power Transistor Division” in terms of packaging product portfolio.

- Dates (from – to)
- Name and address of employer
- Type of business or sector
- Occupation or position held
- Main activities and responsibilities

04/2008 – 06/2011

Automobili Lamborghini S.P.A., Via Modena 12, 40019 Sant'Agata Bolognese (BO), Italy
 Powertrain research and development
 Engine R&D Team Leader for CAE & Simulation
 Responsibility of both "Structural Mechanics" and "Computational Fluid-dynamics" modeling.
 Responsible for Powertrain components definition, calculation and optimization up to final release in production. Full development of a completely new V12 engine (Lamborghini Aventador). Link responsible for Know-how research development with suppliers, AUDI-VW group and Universities for structural, dynamics and reliability subjects.

- Dates (from – to)
- Name and address of employer
- Type of business or sector
- Occupation or position held
- Main activities and responsibilities

01/2006 – 04/2008

Ferrari S.P.A., Via Abetone Inferiore 4 41053 Maranello (MO), Italy
 Powertrain research and development
 Powertrain R&D Engineer, Multi-Body-Dynamic calculation engineer
 Responsible for muly-body and structural dynamic/vibration analysis of road vehicles' powertrain.
 Numerical model correlation with test bench and vehicle testing for structural dynamic and reliability subjects.

- Dates (from – to)
- Name and address of employer
- Type of business or sector
- Occupation or position held
- Main activities and responsibilities

06/2005 – 12/2005

Ferrari S.P.A., Via Abetone Inferiore 4 41053 Maranello (MO), Italy
 Powertrain research and development
 Trainee
 Numerical model construction and experimental correlation for F430 cranktrain.

- Dates (from – to)
- Name and address of employer
- Type of business or sector
- Occupation or position held
- Main activities and responsibilities

03/2002 – 12/2002

CNR-IMM., Stradale Primosole 5095121Catania (CT), Italy
 Research Institution
 Trainee for "Scuola Superiore di Catania"
 Nano-cantilever and MEMS structures design and fabrication.

EDUCATION AND TRAINING

- Dates (from – to)
- Name and type of organization providing education and training
- Principal subjects/occupational skills covered
- Title of qualification awarded
 - Thesis title
 - Type of thesis

01/2007 – 02/2010

Catania University, Department of Mechanic Engineering, Viale Andrea Doria 6, 95123 Catania, Tel:+39 095 7381111
 Numerical Analysis, Mechanical Design , Multi-body-system calculation, Experimental vibration, NVH, Acoustic, FEA, computation stress analysis and fatigue
 PhD in Applied Mathematics to Engineering
 Multibody-Dynamic Calculation of the cranktrain system of a V12 high performance engine
 Numerical/experimental

- Dates (from – to)

09/2000-05/2006

Name and type of organization providing education and training
 Scuola Superiore di Catania per la Formazione d'Ecceellenza, Via S. Nullo 5/i, 95123 Catania, Tel:+39 095351568

- Principal subjects/occupational skills covered
- Title of qualification awarded
- Thesis title
- Type of thesis

Numerical Calculation, Non-linear analysis, Interaction fluid-structure, Statistics, Statistic mechanics, Information technology
 Diploma di Licenza della Scuola Superiore di Catania (high excellence university centre; note: 70/70 with honours).
 Multibody-Dynamic Calculation of a chain timing mechanism of a V12 high performance I.C.E
 Numerical/experimental

- Dates (from – to)

09/2000 – 10/2005

- Name and type of organization providing education and training

Università di Catania-Facoltà di Ingegneria, Viale Andrea Doria 6, 95123 Catania, Tel.:+39 095 7381111

- Principal subjects/occupational skills covered

Mechanical Design, Vibration of complex mechanical systems, FEM, Mathematics, Physics, Engines, Vehicle mechanics and design, Industrial technical drawing, Design and manufacture, Organization and management of industrial processes

- Title of qualification awarded

Master degree in Mechanical Engineering (note: 110/110 with honours)

- Thesis title

Multibody-Dynamic Calculation of the cranktrain a V8 high performance engine

- Type of thesis

Numerical/experimental; produced in collaboration with Ferrari S.p.A.

- Dates (from – to)

09/1995 – 07/2000

- Name and type of organization providing education and training

Liceo Scientifico Statale Leonardo, Giarre (CT); high school

- Principal subjects/occupational skills covered

Mathematics, Physics, Chemistry, Latin, English

- Title of qualification awarded

Maturità scientifica (note: 100/100 with honours)

- Level in national classification

Secondary school Diploma di maturità

PERSONAL SKILLS AND COMPETENCES

MOTHER TONGUE:

ITALIAN

OTHER LANGUAGES

ENGLISH

- Reading skills

FLUENT

- Writing skills

FLUENT

- Verbal skills

FLUENT

GERMAN

• Reading skills	GOOD
• Writing skills	BASIC
• Verbal skills	GOOD

SOCIAL SKILLS AND COMPETENCES

During my working experiences I developed technical competencies in both Automotive and semiconductor industry and I've gradually grown my managerial skills managing people and economical budgets. My professional experiences allowed me to develop strong communicative and team working competences.

TECHNICAL SKILLS AND COMPETENCES

Excellent knowledge of computer programs such as MSC Suite (ADAMS, ADAMS/Engine, ADAMS/Car, program language ADAMS/Macro, Patran, Nastran, MARC); ANSYS; Matlab, Simulink; Pro-E; CATIA V5; Unix /linux; program languages C/C++ and COMSOL Multiphysics. Author of more than 70 technical and conference papers.

ADDITIONAL INFORMATION

-In 2012 I was selected as representative of STMicroelectronics to attend the four months Program "Alta Scuola di Formazione Francesco Saverio Nitri", sponsored by Ministry of Economic Development, developing economical and managerial skill in using granted funds in convergences Areas (Meridione d'Italia).
 -Author of more than 50 papers published in technical journals and international conferences.
 -I've developed my problem solving attitude since secondary school's years participating to Olympic Mathematics and Physics games, attending the national selection and being awarded at national level in 1999 and 2000. Author of more than 80 conference and technical paper.

PATENT

Gitlardo G., Calabretta M., Pappalardo F., "Monitoring device with jumper cable coupling and related methods", US Patent 20150253268 A1
 Smerzi S., Calabretta M., Sitta A., Renna M., "Process for manufacturing a strained semiconductor device and corresponding strained semiconductor device", US Patent 20190326231A1
 Calabretta M., Russo S., Torrisi M., Renna M., "Method for the manufacture of integrated devices including a die fixed to a leadframe", US Patent 20200294950A1, CN Chinese Patent 111682008A