

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

**DOTTORATO DI RICERCA / PHD PROGRAM IN  
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING**

## **Activities and Publications Report**

# PhD Student: **Ciro Scognamillo**

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Student ID: DR993889

**PhD Cycle: XXXV**

PhD Cycle Chairman: Prof. Stefano Russo

**PhD program student's start date: 01/11/2019**

**PhD program student's end date: 31/01/2023**

**Supervisor: prof. Vincenzo d'Alessandro**

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**PhD scholarship funding entity: scholarship funded by prof. Rinaldi's family**

## General information

Ciro Scognamillo received in year 2019 the Master Science degree in Electronics Engineering from the University of Napoli Federico II. He attended a curriculum in Electronics Engineering within the PhD program in Information Technology and Electrical Engineering. He enrolled into the ITEE PhD program with a scholarship funded by prof. Rinaldi's family.

## Study activities

### Attended Courses

| Year | Course Title  | Type            | Credits | Lecturer  | Organization                       |
|------|---|-----------------|---------|---|------------------------------------|
| 1    | Matlab Fundamentals   | Ad hoc course   | 2       | Prof. Agostino De Marco<br>Ing. Stefano Marrone<br>Ing. Francesco Orefice   | ITEE                               |
| 1    | Scientific Programming and Visualization with Python              | Ad hoc course   | 2       | Prof. Alessio Botta   | ITEE                               |
| 1    | Innovation management, entrepreneurship and intellectual property | Ad hoc course   | 5       | StartCup Campania   | UniNa                              |
| 1    | Design and Implementation of Augmented Reality Software Systems   | Ad hoc course   | 4       | Prof. Anna Rita Fasolino<br>Dr. Domenico Amalfitano<br>Dr. Domenico Irilli  | ITEE                               |
| 1    | Machine Learning  | Ad hoc course   | 3.6     | Marco Aiello<br>Anna Corazza<br>Diego Gagnaniello,<br>Francesco Isgrò, Roberto Prevete, Francesco Raimondi, Carlo Sansone | ITEE                               |
| 1    | Topics on Microelectronics  | Ad hoc course   | 5       | Prof. Andrea Baschirotto<br>Prof. Piero Malcovati   | UNIMIB                             |
| 2    | MATLAB Associate Certification                                    | Ad hoc course   | 3.0     | Mathworks   | Mathworks                          |
| 2    | Real Time Embedded Systems  | Ad hoc course   | 2.5     | Prof. Cilardo<br>Prof. Cinque   | ITEE                               |
| 3    | Deep Learning and Neural Networks                                 | External course | 6       | Prof. Giorgio Buttazzo  | Scuola Superiore Sant'Anna di Pisa |

### Attended Seminars

| Year | Seminar Title   | Credits | Lecturer               | Lecturer affiliation              | Organization |
|------|---|---------|------------------------|-----------------------------------|--------------|
| 1    | Flexible two-echelon location-routing for supply networks | 0.2     | Prof. Claudia Archetti | Department of Information Systems | ITEE         |

## Activities and Publications – Final Report

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|   |  |     |                          |  |         |
|---|--|-----|--------------------------|--|---------|
|   |  |     |                          | Decision Sciences and Statistics, ESSEC  |         |
| 1 | A dynamic and probabilistic orienteering problem   | 0.2 | Prof. Claudia Archetti   | Department of Information Systems, Decision Sciences and Statistics, ESSEC       | ITEE    |
| 1 | Lo spazio cibernetico come dominio bellico   | 0.4 | Dott. Gian Piero Siroli  | Dipartimento di Fisica e Astronomia "Augusto Righi"                              | ITEE    |
| 1 | Computational Biology: Large scale data analysis to understand the molecular bases of human diseases                                   | 0.2 | Prof. Michele Ceccarelli | DIETI  | ITEE    |
| 1 | How to get published with the IEEE?  | 0.4 | Eszter Lukacs            | IEEE   | IEEE    |
| 1 | Elettromagnetismo e salute   | 0.2 | Prof. Rita Massa         | Dipartimento di Fisica "Ettore Pancini"  | ITEE    |
| 1 | Access the eLearning library on IEEE Xplore  | 0.2 | Eszter Lukacs            | IEEE   | IEEE    |
| 1 | Large Scale Training of Deep Neural Networks   | 0.5 | Giuseppe Fiameni, PhD    | NVIDIA AI Technology Center Italy  | ITEE    |
| 1 | Design e Nuove tecnologie: Possibili scenari per fronteggiare l'emergenza  | 0.2 | Amleto Picerno Ceraso    | -  | ITEE    |
| 1 | La programmazione europea e la ricerca. Nuovi scenari della programmazione europea dopo il 2020. La gestione di un progetto di ricerca | 0.4 | Ing. Filippo Ammirati    | TECUP  | ITEE    |
| 1 | WindTre:Picus  | 0.4 | Ing. Marcello Savarese   | WindTre  | WindTre |
| 1 | SAS Analytics  | 0.4 | Dr. Cinzia Gianfiori     | SAS Academic Program Manager   | ITEE    |
| 1 | La rapidità della medicina e la velocità del cambiamento del nostro mondo organizzato da Università degli Studi di Napoli. Health 4.0. | 0.4 | Paolo Netti              | Dipartimento di Ingegneria chimica, dei Materiali e della Produzione industriale | ITEE    |
| 1 | Realtà Virtuale e salute reale. Health 4.0. Dal bit alla mente: spazi virtuali per la salute   | 0.5 | Valentino Megale         | Softcare Studio  | ITEE    |

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|   |   |     |  |  |                                |
|---|---|-----|--|--|--------------------------------|
| 1 | Campi elettromagnetici pulsati: dal meccanismo d'azione alle applicazioni cliniche                            | 0.3 | Dott.ssa Simona Salati   | Dipartimento di Biotecnologie e Medicina Molecolare  | ITEE                           |
| 1 | Planning 5G under EMF constraints: challenges and opportunities.  | 0.4 | Prof. Luca Chiaraviglio  | Networking Group in the Department of Electronic Engineering of University of Rome Tor Vergata | ITEE                           |
| 1 | SPS Webinar Series - SPACE (Signal Processing And Computational image formation)                              | 0.4 | Raja Giryes, Laura Waller, Michael Unser, Katie Bouman, Yoram Bresler, Orazio Gallo, Saiprasad Ravishankar | IEEE Signal Processing Society   | IEEE Signal Processing Society |
| 1 | Strategie per creare un ponte tra la ricerca universitaria e le imprese                                       | 0.2 | Ateneo Webinar APEF  | -  | APEF                           |
| 1 | Virtual seminars on SENSING (PLASMONICA)  | 0.8 | Michele Marina Giordano, Chiara Novara, Riccardo Sapienza  | PLASMONICA   | ITEE                           |
| 1 | Applicazioni mediche dei campi elettromagnetici basate sull'incremento di temperatura: ipertermia e ablazione | 0.4 | Prof. Marta Cavagnaro  | UniRoma1   | UniRoma1                       |
| 1 | CVPL CV & ML online seminar. Bias from the wild   | 0.4 | Prof. Nello Cristianini  | University of Bristol  | University of Bristol          |
| 1 | Progettare per l'industria con la simulazione   | 0.2 | COMSOL online webinar  | COMSOL   | COMSOL                         |
| 1 | Malattie professionali da Campi Elettromagnetici tra Scienza e Giurisprudenza                                 | 0.2 | Dott. Alessandro Polichetti  | Istituto Superiore di Sanità (ISS)   | ITEE                           |

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|---|--|-----|---|--|---------------------------------|
| 1 | Laboratorio virtuale gratuito con COMSOL Multiphysics®   | 0.4 | COMSOL online webinar                         | COMSOL   | COMSOL                          |
| 1 | AC/DC Coil Modeling Lecture Series Session 4: Modeling 3D Coils  | 0.2 | COMSOL online webinar                         | COMSOL   | COMSOL                          |
| 1 | CVPL CV & ML online seminar. Adversarial attacks on image classifiers  | 0.4 | Prof. Andrea Cavallaro                        | Turing Fellow at The Alan Turing Institute                                   | ITEE                            |
| 1 | Progettare batterie con la simulazione   | 0.2 | COMSOL online webinar                         | COMSOL   | COMSOL                          |
| 1 | Noninvasive Mapping of Electrical Properties Using MRI   | 0.3 | Prof. Riccardo Lattanzi                       | NYU Langone Health   | NYU Langone Health              |
| 1 | Exploring Autonomy in Robotic Flexible Endoscopy   | 0.4 | Prof. Pietro Valdastri                        | Chair in Robotics & Autonomous Systems, Leeds University                     | ITEE                            |
| 1 | Valutazione dei livelli di esposizione e del rispetto dei limiti Antenne e 5G                                    | 0.3 | Prof. MD Migliore                             | Uni Cassino e Lazio Meridionale  | Uni Cassino e Lazio Meridionale |
| 1 | Misure di segnali complessi nell'ambiente: Sistemi 5G  | 0.3 | Dr. D. Franci                                 | Arpa Lazio   | Arpa Lazio                      |
| 1 | Estrapolazioni su segnali 4G e 5G  | 0.3 | Dr. S. Adda, Arpa Piemonte, Dr. S. Pavoncelli | Arpa Lazio   | Arpa Lazio                      |
| 2 | SSM Scientific Colloquia   | 0.4 | Dr. Capozziello                               | Dipartimento di Fisica "Ettore Pancini"                                      | ITEE                            |
| 2 | SSM Scientific Colloquia   | 0.4 | Dr. Fusco                                     | Gran Sasso Science Institute   | ITEE                            |
| 2 | SSM Scientific Colloquia   | 0.4 | Dr. Bullo                                     | Department of Mechanical Engineering, University of California Santa Barbara | ITEE                            |
| 2 | SSM Scientific Colloquia   | 0.4 | Dr. Risaliti                                  | Department of Physics and Astronomy, University of Florence                  | ITEE                            |
| 2 | Picariello Lectures Lesson IV: #andràtuttobene: Images, Texts, Emojis & Geodata in a Sentiment Analysis Pipeline | 0.2 | Prof. Serena Pelosi                           | Director of RIILP, Professor of Computational Linguistics                    | ITEE                            |

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|   |   |     |                                  |  |      |
|---|---|-----|----------------------------------|--|------|
| 2 | Picariello Lectures<br>Lesson V:<br>At the Nexus of Big Data,<br>Machine Intelligence, and<br>Human Cognition   | 0.2 | Prof.<br>George S.<br>Djorgovski | Professor of<br>Astronomy and Data<br>Science. Director,<br>Center for Data-<br>Driven Discovery   | ITEE |
| 2 | Picariello Lectures<br>Lesson VI:<br>Exploiting Deep Learning<br>and Probabilistic Modeling<br>for Behavior Analytics                                   | 0.2 | Prof.<br>Giuseppe<br>Manco       | Director of Research<br>at the Institute of<br>High Performance<br>Computing and<br>Networks of the<br>National Research<br>Council of Italy | ITEE |
| 2 | Picariello Lectures<br>Lesson VII:<br>Data Driven Transformation<br>in WINDTRE through<br>Managers voice  | 0.4 | Marcello<br>Savarese             | Chief Data Analytics<br>Officer presso Wind<br>Tre   | ITEE |
| 2 | Picariello Lectures VIII:<br>From Photometric Redshifts<br>to Improved Weather<br>Forecast an interdisciplinary<br>view on machine learning             | 0.2 | Prof. Kai<br>Polsterer           | Group Leader<br>Astroinformatics   | ITEE |
| 2 | Picariello Lectures IX:<br>Cybercrime and electronic<br>evidence, The international<br>legal framework for an<br>effective criminal justice<br>response | 0.2 | Matteo<br>Lucchetti              | National Cyber<br>Security Competence<br>Center  | ITEE |
| 2 | Picariello Lectures<br>Lesson X:<br>Artificial Intelligence for<br>notary's sector - a case<br>study  | 0.2 | Salvatore<br>Palange             | Founder di Fluel<br>Innovation for<br>Business   | ITEE |
| 2 | Picariello Lectures<br>Lesson XI:<br>The era of Industry 4.0: new<br>frontiers in business model<br>innovation  | 0.2 | Marco<br>Balzano                 | University Ca' Foscari<br>in Venice  | ITEE |
| 2 | Picariello Lectures<br>Lesson XII:<br>Machine Learning: causality<br>lost in translation  | 0.2 | Edwin A.<br>Valentijn            | Kapteyn Astronomical<br>Institute, University of<br>Groningen The<br>Netherlands   | ITEE |
| 2 | Picariello Lectures<br>Lesson XIII:<br>Approaches to Graph<br>Machine Learning  | 0.2 | Miroslav<br>Cepek                | ORACLE LABS  | ITEE |

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|   |  |     |                          |   |      |
|---|--|-----|--------------------------|---|------|
| 2 | SSM Scientific Colloquia   | 0.4 | Dr. Juergen Kurths       | Humboldt University Berlin  | ITEE |
| 2 | SSM Scientific Colloquia   | 0.4 | Dr. Rosario Fazio        | Scuola Normale Superiore in the CMI (Condensed Matter and quantum Information)  | ITEE |
| 2 | SSM Scientific Colloquia   | 0.4 | Dr. Maurizio Porfiri     | New York University Tandon School of Engineering  | ITEE |
| 2 | SSM Scientific Colloquia   | 0.2 | Dr. Francesco Solombrino | “Renato Caccioppoli” Department of Mathematics and Applications, University of Naples Federico II                         | ITEE |
| 2 | SSM Scientific Colloquia   | 0.4 | Dr. Auricchio            | Department of Civil Engineering and Architecture Computational Mechanics and Advanced Materials Group University of Pavia | ITEE |
| 2 | SSM Scientific Colloquia   | 0.4 | Dr. Longo                | Università degli Studi di Napoli Federico II  | ITEE |
| 2 | SSM Scientific Colloquia   | 0.4 | Dr. Musolesi             | University College London, U.K  | ITEE |
| 2 | Picariello Lectures Lesson XIV: Visual Interaction and Communication in Data Science | 0.4 | Marco Quartulli          | Vicomtech (E)   | ITEE |
| 2 | Picariello Lectures Lesson XV: Big Data and Computational Linguistics                | 0.4 | Francesco Cutugno        | Università degli Studi di Napoli Federico II  | ITEE |
| 2 | Picariello Lectures Lesson XVI: Sensoria Health                                      | 0.2 | Stefano Rossotti         | SENSORIA Health   | ITEE |
| 2 | Picariello Lectures Lesson XVII: The coming revolution of Data driven Discovery      | 0.2 | Prof. Giuseppe Longo     | Università degli Studi di Napoli Federico II  | ITEE |
| 2 | Picariello Lectures Lesson XVIII:  | 0.2 | Francesco Matteucci      | Università degli Studi di Napoli Federico II  | ITEE |

|   |   |     |  |                               |      |
|---|---|-----|--|-------------------------------|------|
|   | DoveAndiamoDomani - Deep Tech   |     |  |                               |      |
| 2 | Picariello Lectures<br>Lesson XIX:<br>Artificial Intelligence and 5G combined with holographic technology: a new perspective for remote health monitoring | 0.4 | Dr. Pietro Ferraro<br>Dr. Pasquale Memmolo | RFI Rete Ferroviaria italiana | ITEE |
| 2 | Picariello Lectures<br>Lesson XX:<br>Distributional Semantics Methods: How Linguistic features can improve the semantic representation                    | 0.4 | Alessandro Maisto<br>Flora Amato           | UNISA                         | ITEE |

### Research activities

Ciro Scognamillo participated in the research on thermal and electrothermal (ET) effects in devices, circuits, and systems. More specifically, he contributed to the research of the following topics: (i) highly-efficient ET analysis of multicellular SiC MOSFETs, (ii) thermal investigation and ET modeling of InGaP/GaAs – SiGe HBTs, GaN – SiC-based power modules, (iii) fault diagnosis in PV panels (with an infrared method denoted as EMPHASIS), (iv) ballasting networks in InGaP/GaAs-based RF power amplifiers. During his period abroad, **Ciro Scognamillo** has been a visiting Ph.D. student at the Université de Bordeaux, France, where he contributed to develop an in-situ thermal impedance measurement technique for power devices without any need for temperature measurements or thermochuck/cold plates. **Ciro Scognamillo** has presented 7 contributions at international conferences (EuroSimE, THERMINIC, ESREF, ISPSD, PRIME) and 1 poster contribution at the 53<sup>rd</sup> annual meeting of SIE (Società Italiana di Elettronica).

### Tutoring and supplementary teaching activities

- BSc thesis tutorship for Claudio Bovenzo, Gabriele Felaco, Francesco Cacciapuoti, and Giuseppe della Ragione.
- 50-hour tutorship assistance to 1st year courses (Fisica I, Fisica II) given to proff. Valore and Montemurro.

### Credits summary

| PhD Year        | Courses | Seminars | Research | Tutoring / Supplementary Teaching |
|-----------------|---------|----------|----------|-----------------------------------|
| 1 <sup>st</sup> | 21.6    | 11.1     | 40.9     | 0                                 |
| 2 <sup>nd</sup> | 5.5     | 8.6      | 44       | 0                                 |
| 3 <sup>rd</sup> | 6       | 0        | 64       | 0                                 |



### Research periods in institutions abroad and/or in companies

| PhD Year        | Institution  | Hosting tutor                                | Period                  | Activities   |
|-----------------|--|--|-------------------------|--|
| 1 <sup>st</sup> | Primes Laboratories, Tarbes, France                  | Dr. Philippe Lasserre                        | 13-17/01/2020           | Manufacturing and testing of state-of-the-art single-sided and double-sided cooled power modules. Experiments on their electrical ruggedness, the results of which were published in a Microelectronics Reliability contribution.                    |
| 3 <sup>rd</sup> | Université de Bordeaux (Aquitaine), Bordeaux, France | Prof. Thomas Zimmer, dr. Sebastien Fregonese | 15/10/2021 – 15/04/2022 | Research on state-of-the-art RF SiGe HBTs and thermal impedance extraction techniques. Lab experiments on DC and RF measurements on SiGe HBTs. Joint scientific paper preparation and publication on IEEE Transactions on Power Electronics Letters. |

### PhD Thesis

In the PhD Thesis, **Ciro Scognamillo** investigates thermal and electrothermal (ET) effects in devices, circuits, and systems. Traditionally, ET effects have been regarded as detrimental to the electrical performance of devices, as well as to their long-term reliability; moreover, they represent a valuable source of information about the integrity of the system, as they inherently show the effect of the heat flowing through the layers of the assembly.

Both aspects of ET effects have been studied: for instance, in the analyses of a 30 kW DC-DC converter and a single-phase 50 Hz-400 V inverter – both included in a state-of-the-art SiC-based multichip power module (PM) – an innovative technique to reconstruct the temperature field at any point of a SPICE ET simulation is shown, opening up design and diagnosis scenarios in the power electronics field. Maximum operating temperatures, limit-cycle behavior, and nonlinear thermal effects are investigated in both cases study.

In addition, a technique for the measurement of the thermal impedance of power device is also proposed. The novelty of such approach lies in its in-situ capabilities, that is, the technique can be applied to devices working in their application environment, without any need to perform laboratory measurements and/or exploit specific equipment such as thermochuck or cold plates. The theory behind the technique is derived from RF devices measurement methodologies. An unambiguous validation is carried out by resorting to the ‘simulated experiments’ strategy, in which the quantity to evaluate (i.e., the thermal impedance of a device) is already known and used as a reference in a comparison with the outcome of the technique.

It is also worth highlighting that several thermal-only analyses are included in the thesis, as they play a relevant role in (i) extracting thermal feedback networks, (ii) measuring thermal metrics such as self- and mutual-heating thermal resistance and thermal impedances, and (iii) carrying out fault detection campaigns by means of structure functions.

### Publications

Research results appear in 9 papers published in international journals, 15 contributions to international conferences, 2 contributions to national conferences, 1 book chapter.

## List of scientific publications

### International journal papers

A. P. Catalano, **C. Scognamillo**, V. d'Alessandro, and A. Castellazzi,  
Numerical analysis and analytical modeling of the thermal behavior of single- and double-sided cooled power modules,  
*IEEE Transactions on Components, Packaging and Manufacturing Technology*,  
vol. 10, no. 9, pp. 1446–1453, Sep. 2020, DOI: 10.1109/TCPMT.2020.3007146.

**C. Scognamillo**, S. Fregonese, T. Zimmer, V. d'Alessandro, and A. P. Catalano,  
Combined experimental-FEM investigation of electrical ruggedness in double-sided cooled power modules,  
*Microelectronics Reliability*,  
113742, 2020, 10.1016/j.microrel.2020.113742.

**C. Scognamillo**, S. Fregonese, T. Zimmer, V. d'Alessandro, and A. P. Catalano,  
Circuit-based electrothermal simulation of multicellular SiC power MOSFETs using FANTASTIC,  
*Energies*,  
vol. 13, no. 17, 4563, 2020, DOI: 10.3390/en13174563.

A. P. Catalano, **C. Scognamillo**, P. Guerriero, S. Daliento, and V. d'Alessandro,  
Using EMPHASIS for the thermography-based fault detection in photovoltaic plants,  
*Energies*,  
vol. 14, no. 16, 1559, 2021, DOI: 10.3390/en14061559.

V. d'Alessandro, A. P. Catalano, **C. Scognamillo**, L. Codecasa, and P. J. Zampardi,  
Analysis of electrothermal effects in devices and arrays in InGaP/GaAs HBT technology,  
*Electronics*,  
vol. 10, no. 6, 757, 2021, DOI: 10.3390/electronics10060757.

L. Codecasa, V. d'Alessandro, A. P. Catalano, **C. Scognamillo**, D. D'Amore, and K. Aufinger ,  
Accurate and efficient algorithm for computing structure functions from the spatial distribution of thermal properties in electronic devices,  
*IEEE Transactions on Electron Devices*,  
vol. 68, no. 11, pp. 5386–5393, 2021, DOI: 10.1109/TED.2021.3073647.

**C. Scognamillo**, A. P. Catalano, M. Riccio, V. d'Alessandro, L. Codecasa, A. Borghese, A. Castellazzi, G. Breglio, and A. Irace,  
Compact modeling of a 3.3 kV SiC MOSFET power module for detailed circuit-level electrothermal simulations including parasitics,  
*Energies*,  
vol. 14, no. 15, 4683, 2021, DOI: 10.3390/en14154683.

V. d'Alessandro, A. P. Catalano, **C. Scognamillo**, M. Müller, M. Schröter, P. J. Zampardi, and L. Codecasa, Experimental Determination, Modeling, and Simulation of Nonlinear Thermal Effects in Bipolar Transistors under Static Conditions: A Critical Review and Update, *Energies*, vol. 15, no. 15, 5457, 2022, DOI: 10.3390/en15155457.

**C. Scognamillo**, S. Fregonese, T. Zimmer, V. d'Alessandro, and A. P. Catalano, A Technique for the *In-Situ* Experimental Extraction of the Thermal Impedance of Power Devices, *IEEE Transactions on Power Electronics Letters*, vol. 37, no. 10, pp. 11511–11515, Oct. 2022, DOI: 10.1109/TPEL.2022.3174617.

### International conference papers

A. P. Catalano, **C. Scognamillo**, A. Castellazzi, and V. d'Alessandro, Optimum thermal design of high-voltage double-sided cooled multi-chip SiC power modules *Proc. IEEE International Workshop on Thermal Investigations of ICs and Systems (THERMINIC)* Lecco, Italy, Sep. 2019, IEEE, DOI: 10.1109/THERMINIC.2019.8923763.

**C. Scognamillo**, A. P. Catalano, R. Trani, V. d'Alessandro, and A. Castellazzi, Influence of bumps height on electric field in double sided cooling power modules *Proc. International Symposium on Advanced Power Packaging (ISAPP)* Osaka, Japan, Oct. 2019, not indexed.

R. Trani, A. P. Catalano, **C. Scognamillo**, V. d'Alessandro, and A. Castellazzi, "Optimum thermal management design for compact PCB-based high frequency GaN assemblies *Proc. International Symposium on Advanced Power Packaging (ISAPP)* Osaka, Japan, Oct. 2019, not indexed.

A. P. Catalano, R. Trani, **C. Scognamillo**, V. d'Alessandro, and A. Castellazzi, Optimization of thermal vias design in PCB-based power circuits *Proc. IEEE 21st International Conference on Thermal, Mechanical and Multi-Physics Simulation and Experiments in Micro-Electronics and Micro-Systems (EuroSimE)*, Cracow, Poland (held in remote mode), Jul. 2020, IEEE, ISBN 978-1-7281-6049-8; DOI: 10.1109/EuroSimE48426.2020.9152723

A. P. Catalano, O. Olanrewaju, **C. Scognamillo**, V. d'Alessandro, and A. Castellazzi, Stress-induced vertical deformations in state-of-the-art power modules: An improved electro-thermo-mechanical approach *Proc. IEEE 21st International Conference on Thermal, Mechanical and Multi-Physics Simulation and Experiments in Micro-Electronics and Micro-Systems (EuroSimE)* Cracow, Poland (held in remote mode), Jul. 2020. ISBN: 978-1-7281-6049-8; DOI: 10.1109/EuroSimE48426.2020.9152727.

**C. Scognamillo**, A. P. Catalano, R. Trani, V. d’Alessandro, and A. Castellazzi,  
3-D FEM investigation on electrical ruggedness of double-sided cooling power modules  
Proc. IEEE 21st International Conference on Thermal, Mechanical and Multi-Physics Simulation and Experiments in Micro-Electronics and Micro-Systems (EuroSimE)  
Cracow, Poland (held in remote mode), Jul. 2020. ISBN: 978-1-7281-6049-8; DOI: 10.1109/EuroSimE48426.2020.9152740.

A. P. Catalano, **C. Scognamillo**, R. Trani, A. Castellazzi, and V. d’Alessandro,  
Experimental validation of analytical models for through-PCB thermal vias  
Proc. IEEE 26th international workshop on THERMal INvestigations of ICs and systems (THERMINIC)  
Berlin, Germany (held in remote mode), Sep. 2020. ISBN: 978-1-7281- 7643-7; DOI: 10.1109/THERMINIC49743.2020.9420502.

**C. Scognamillo**, A. P. Catalano, A. Castellazzi, and V. d’Alessandro,  
Numerical analysis of the thermal impact of ceramic materials in double-sided cooled power modules  
Proc. IEEE 26th international workshop on THERMal INvestigations of ICs and systems (THERMINIC)  
Berlin, Germany (held in remote mode), Sep. 2020. ISBN: 978-1-7281- 7643-7; DOI: 10.1109/THERMINIC49743.2020.9420509.

**C. Scognamillo**, A. P. Catalano, A. Borghese, M. Riccio, V. d’Alessandro, G. Breglio, A. Irace, R. N. Tripathi, A. Castellazzi, and L. Codecasa,  
Electrothermal modeling, simulation, and electromagnetic characterization of a 3.3 kV SiC MOSFET power module  
Proc. IEEE 33rd International Symposium on Power Semiconductor Devices and ICs (ISPSD)  
Nagoya, Japan (held in remote mode), pp. 123–126, May-Jun. 2021. ISSN: 1063- 6854; ISBN: 978-4-88686-422-2; DOI: 10.23919/ISPSD50666.2021.9452207.

**C. Scognamillo**, A. P. Catalano, P. Guerriero, S. Daliento, L. Codecasa, and V. d’Alessandro,  
PV fault detection through IR thermography: using EMPHASIS under uneven environmental conditions  
Proc. IEEE 27th international workshop on THERMal INvestigations of ICs and systems (THERMINIC)  
Berlin, Germany (held in remote mode), Sep. 2021. ISBN: 978-1-6654-1896-6; DOI: 10.1109/THERMINIC52472.2021.9626516.

A. P. Catalano, **C. Scognamillo**, A. Castellazzi, L. Codecasa, and V. d'Alessandro,  
Study of the thermal behavior of double-sided cooled power modules  
Proc. IEEE 27th international workshop on THERMal INvestigations of ICs and systems (THERMINIC)  
Berlin, Germany (held in remote mode), Sep. 2021. ISBN: 978-1-6654-1896-6; DOI:  
10.1109/THERMINIC52472.2021.9626525.

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### Awards and Prizes

In 2022, *Ciro Scognamillo* was awarded the “*Borsa Califano*” prize, from the University of Rome “*La Sapienza*”, for his research in the field of renewable energy and diagnostics of PV modules/fields.

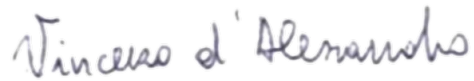
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PhD student signature



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Supervisor signature



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