



David Novel

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• WORK EXPERIENCE

FONDAZIONE BRUNO KESSLER - TRENTO, ITALY

HEAD OF UNIT 01/01/2026 - CURRENT

I lead the [SPIN](#) (Sensors Packaging and INtegration) Unit within the [Sensors and Devices Center](#) in FBK.

SPIN aims to transform electronic packaging of detector systems from an engineering constraint, enabling compact, robust, and intelligent sensing systems where conventional solutions fail.

In extreme environments, particle vertexing systems where material thickness should be limited or in-vivo precision medicine with miniaturized probes, silicon detector by itself is not enough and packaging and integration become key drivers in performance.

In particular, SPIN support the packaging/integration of detectors produced in-house and state-of-the-art MAPS from external foundries, representing a strategic capability within the Sensors & Devices Center.

Its core activities include the design of custom electronics, process development of heterogeneous/3D integration processes for sensors and readout architectures. Also, the creation of flexible and high-density packaging concepts, with applications ranging from particle physics to materials characterization, from space technology to gas detection and medical technology.

The Unit also conducts research on innovative materials, including wood-based and flexible materials.

TENURE TRACK RESEARCHER 05/12/2025 - CURRENT

The Tenure Track focuses on innovative research and development of novel technological solutions and platforms for detector packaging.

• RESEARCH FELLOW 29/02/2020 - 31/12/2025

MNF (Micro Nano Facility) Unit, Fondazione Bruno Kessler (FBK), Trento, Italy.

I supervised packaging-related activities and projects of the team. In 2022-24 I was Packaging Area coordinator. In 2023-2024 I was safety supervisor of three characterization laboratories. I was a member of the Board of the MNF.

My research focused on four main areas: additive manufacturing, innovative materials and engineered wood processing, gaseous electron multipliers (GEMs) for X-ray detection in space, and low-material-budget flexible printed circuits (FPCs) for particle detectors.

From September 2022, I am the principal investigator for FBK for the project [SU.PRE.MO](#). I coordinate project research activities for a 2–5 person team, managing the budget and stakeholder relations. I also led the technical and scientific review with the funding body. During the project's first year, I contributed to tender documentation for laboratory instrumentation and to setting up the dedicated project laboratory.

Keywords: Research, Fabrication, Gas Electron Multipliers, Flexible electronics, Packaging, Space, High Energy Physics, Additive Manufacturing, Materials Engineering.

31/10/2015 - CURRENT

ACADEMIC TUTOR AND MEMBER OF THE BOARD OF DIRECTORS COLLEGIO CLESIO

Academic tutoring of students of “Collegio Clesio” from scientific departments since 2015. Member of the Board of Directors of “Collegio Clesio” since 2015.

Keywords: Academia, Mentoring.

31/01/2016 - 31/01/2017

ASSISTANT LECTURER UNIVERSITY OF TRENTO, DEPARTMENT OF CIVIL, ENVIRONMENTAL AND MECHANICAL ENGINEERING

Assistant Lecturer for the course of Static Structures [Statica ICAR/08] - 28 hours

Activities: design and develop teaching and assessment material; hold theory and practice lectures as well as written and oral exams.

Keywords: Academia, Teaching, Engineering, Structures.

• **EDUCATION & TRAINING**

31/08/2010 - 31/08/2013 - ITALY

BACHELOR'S DEGREE IN INDUSTRIAL ENGINEERING- UNIVERSITY OF TRENTO, DEPARTMENT OF INDUSTRIAL ENGINEERING

Winner of the scholarship at the “Collegio di Merito Bernardo Clesio”. Thesis on Ceramic Materials. **Final grade:** Cum Laude | **Level in EQF:** 6

31/08/2013 - 30/09/2015

MASTER'S DEGREE I MATERIALS ENGINEERING- UNIVERSITY OF TRENTO, DEPARTMENT OF INDUSTRIAL ENGINEERING

Winner of the scholarship at the “Collegio di Merito Bernardo Clesio”. Thesis on Nanocomposites. **Final grade:** Cum Laude | **Level in EQF:** 7

31/10/2015 - 30/06/2019

PHD IN CIVIL, ENVIRONMENTAL AND MECHANICAL ENGINEERING- UNIVERSITY OF TRENTO

Joint scholarship between Department of Civil, Environmental and Mechanical Engineering, University of Trento, Italy and Fondazione Bruno Kessler (FBK), Trento, Italy. Awarded of the additional label of “Doctor Europaeus”

Assistant for several oral exams of Solid Mechanics [Scienza delle costruzioni ICAR/08] during the PhD program.

Visiting at Queen Mary University and Nanoforce LTD in London, UK during 2018 for a research project focused on transparency, electrical conductivity and strain-sensing capabilities of wood.

Thesis on graphene composites.

10/2019 - 06/2020

FORMATION COURSE FOR TEACHING CERTIFICATION- UNIVERSITY OF TRENTO

24 CFU on Educational Anthropology, Pedagogy, Psychology, and modern teaching methodologies.

• **SKILLS**

monitor developments in field of expertise | problem solving | teamplayer | Nanomaterial characterisation (SEM, EDX, FTIR, XRD, TGA and UV-Vis)

Software

data processing and analysis software: Origin (advanced) | Microsoft Office | ImageJ for image processing | CAD & CAM software | Circuit designing KiCad | MATLAB | ParticleX/Perception | Lithographic designs with KLayout

Science management skills

manage intellectual property rights | coordinate operational activities | manage and run several projects | Draft and submit projects | project management | Communication and Public Relations | supervise doctoral students | manage relationships with stakeholders | Drive TRL advancement | conduct public presentations | manage teamwork | teach in academic or vocational contexts

Technical skills

etching and deposition | circuit editing by FIB | clean rooms | detector packaging | detector integration with flexible printed circuits | PFIB | Microfabrication methods | additive manufacturing

• NETWORKS AND MEMBERSHIPS

29/02/2020 - CURRENT

Fondazione Bruno Kessler INFN Associate (TIFPA - Limadou).

Part of the DRD1 R&D Collaboration for MPGDS, Observer for DRD7 (<https://cds.cern.ch/record/2885937>).

Working on the XGIS for the Theseus Collaboration (<https://www.isdc.unige.ch/theseus/>).

Experience in fabrication and materials characterization techniques with trainings to tenths of users with several backgrounds.

Experience in conventional manufacturing (CNC machine 4-axis) of polymers and aluminium alloys, additive manufacturing (SLM/L-PBF) and "micro" manufacturing such as silicon circuit-edit (Plasma-FIB).

I collaborate in several National and European projects and also managed industrial technology transfers to high TRL levels.

Mentoring of PhD students and direct supervisor of researchers and technologists.

My team won the 2025 Proof of Concept program by FBK (1st of 37 projects). As a PhD student, I was rewarded with the best poster award by Mildred Dresselhaus at Graphene 2016, since then I participated as a speaker to several scientific conferences. Member of the Programme Committee of the Nanoinnovation 2023 conference. Member of selection committees for 7 resources in FBK.

• LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1

• PUBLICATIONS

Patents

In these years, my research activities generated five submitted patents in two different technological areas (advanced flexible packaging and engineered wood).

Selected Publications

* W Leone, R Mearns, et al, "CubeSats Reach the Millisecond X-Ray Domain: Crab Pulsar Timing with SPIRIT/HERMES", The Astrophysical Journal 1001 (1), 5

* S Srivastava, E Demenev, C Labanti, L Amati, et al, "Testing and Characterization of Detection Plane Elements of the XGIS Instrument on Board the THESEUS Mission", Particles 9 (1), 7

* G Mattioli, C Labanti, et al, "The X and Gamma-Ray Imager and Spectrometer Onboard THESEUS—Status and Technological Progresses", Particles 9 (1), 3

- * D Novel, A Pegoretti, NM Pugno, "Multiple necking coalescence in graphene and graphene oxide reinforced electrospun PVDF partially hollow nanocomposite fibers with superplastic behavior", *Nanocomposites* 11 (1), 282-296
- * D Novel, A Lega, T Facchinelli, R Iuppa, S Beol , P Bellutti, "R&D on Flexible and Low-Material-Budget Packaging for High-Frequency Communication in Future MAPS Detectors", 2025 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference
- * D Novel, A Lega, T Facchinelli, R Iuppa, S Beol , P Bellutti, "A packaging method for ALPIDE integration enabling flexible and low-material-budget designs", *Journal of Instrumentation* 20 (06), C06021
- * D Novel, A Lega, T Facchinelli, R Iuppa, S Beol , P Bellutti, "Evolution of flexible PCBs in particle detection: From ALICE ITS1 to future frontiers in microfabrication for ALPIDE chip integration", in *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 2024/9/4
- * A Lega, D Novel, T Facchinelli, C Sgr , L Baldini, M Minuti, M Boscardin, G Pepponi, R Iuppa, R Hall-Wilton, L Latronjico "Plasma-Based Etching Approach for GEM Detector Microfabrication at FBK for X-ray polarimetry in space," in *Journal of Instrumentation*, 19(04), C04017, 2024
- * P Mirandola, V Lunetto, D Novel, M Barozzi, P Bellutti, "Strength and microstructure of friction stir welded additively manufactured Scalmalloy  in as-welded and heat-treated conditions", *Journal of Manufacturing Processes*, 2023. <https://doi.org/10.1016/j.jmapro.2023.04.051>. Electronic ISSN: 1433-3015
- * A Gaiardo, D Novel, E Scattolo, M Crivellari, A Picciotto, F Ficorella, "Optimization of a Low-Power Chemoresistive Gas Sensor: Predictive Thermal Modelling and Mechanical Failure Analysis", in *Sensors*, 2021. <https://doi.org/10.3390/s21030783>. ISSN: 1424-8220
- * D Novel, S Ghio, A Gaiardo, A Picciotto, V Guidi, G Speranza, M Boscardin, P Bellutti, and N M Pugno "Strengthening of Wood-like Materials via Densification and Nanoparticle Intercalation" *Nanomaterials* 10, no. 3 (March 2020): 478. <https://doi.org/10.3390/nano10030478>. ISSN: 2079-4991
- * P Mirandola, D Novel, M Perini, M Benedetti, F Lombardi, V Lunetto, & Spena, Microstructures and mechanical properties of friction stir welded additively manufactured Scalmalloy . *The International Journal of Advanced Manufacturing Technology*, 2024, 1-16