Position Title and No.	
Name of Staff	Carlo Brondi
Employer	Cnr STIIMA - Institute of Intelligent Industrial Technologies and Systems for Advanced Manufacturing - National Research Council of Italy
Date of Birth	02/03/1975
Nationality	Italian

Education:

School, college and/or University Attended	Degree/certificate or other specialized education obtained	Date obtained
University of Naples Federico II Italy	Master's degree in materials engineering - Master's degree	2002
CNR - National Research Council - Institute of Industrial Technology and Automation (ITIA - CNR)	Master's degree in industrial research production systems Second-cycle degree (7th EQF level)	2003

Professional Certification or Membership in Professional Associations:

Other Relevant Training:

Countries of Work Experience (last ten years):

Country (From-To)	Country (From-To)	Country (From-To)
Italy (2004-2023)	Italy (2004-2023)	Italy (2004-2023)

Language Skills (indicate only languages in which you can work):

Language	Reading	Speaking	Writing
Italian	Native		
English	Very good	Good	Very good

Employment record:

Period	Employing organization and your title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
2020 - Ongoing	Cnr EC Team Leader	Italy	**Research programme: EU H2020 Program H2020-EU.2.1.5. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Advanced manufacturing and processing Main Programme, H2020-EU.2.1.5.1. - Technologies for Factories of the Future, Contract Number: 958410**

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			Scientific coordinator and responsible for the task "T6.1 Life-Cycle Assessment and Costing tool (LCAC)" for the development of a report on the methodological approach for the aggregation of dynamic data from the field and data transformation (D6.1) and development of a prototype tool (D6.2) to interface with various tools (s-CAPP Sustainable Computer Aided Process Planning tools, DES – Discrete Event Simulation, CPS digital twin,) towards a platform for final decision support. The tool integrates field data from three different production lines in the sector food in Alovera (Spain), wood in Kocaeli (Turkey) and furniture in Valencia (Spain) through sensors to create dynamic monitoring of the environmental and economic performance of the line over time, to provide indications for future production planning and to identify impacts linked to individual product batches in a DPP (Digital Product) logic Passport)
2015 - 2019	Cnr EC Team Leader	Italy	**Research programme: SYMBIOPTIMA - Human-mimetic approach to the integrated monitoring, management and optimization of a symbiotic cluster of smart production units** Within WP4 ascalable methodology (T4.1) to define the sustainability of the process industry with reference to the most up-to-date methodologies both at cluster and company level. This methodology was transferred to a software prototype "Symbinet" (T4.2) to evaluate the environmental performance of industrial symbiosis networks. This dynamic tool helps to qualify and quantify the sustainability of business networks that work together according to an optimized symbiosis strategy. Its potential contribution is in line with the objectives of European Community, which have become increasingly relevant in recent years in industrial terms. In the last part of the project, existing standards linked to the project results were analyzed with a view to their improvement to support the digitalisation of the symbiosis (T4.3). This activity was then followed by involvement in organizations such as SUN and the ISO TC 323
2023 - Ongoing	Cnr Italian Ministry of Economic Development Team Leader	Italy	**Research programme : Extended Partnership "Circular and Sustainable Made in Italy": basic research at the service of the supply chain** **Spoke Activity 7 - RESTART - REsilient, SusTainable and circulAr leatheR and Textile supply chains-** Analysis of the textile and leather supply chains in four main areas. Organizational-relational: distinctive skills, organizational structures (levels of vertical integration), orchestration mechanisms, types of buyer-supplier relationships (information exchanges, cooperative rules, legal ties), performance evaluation and control models (financial and sustainability), interconnections with upstream markets (mechanical-textiles, raw materials) and downstream markets (clothing, furniture, etc.); Logistics-production: operational links, production planning and control practices, logistics flows (open and closed cycle), production localization decisions (offshoring/reshoring); Technological and information: technologies to support digitalisation, traceability, automation and optimization (costs, times, environmental impact) of the various processes (product development/design, production, distribution, marketing/sales) and anti-counterfeiting . Legal and regulatory: regulations and certifications that have a major impact on textile and leather supply chains (e.g. extended producer responsibility) and their impact;
2019 - Ongoing	Cnr Vibram SpA Italy	Italy	**LCA study based on EPD scheme for the Tront product, Comparative LCA study for the Wrap Tech product, Albizzate monitoring tool update and development of third-party tools for product LCA analysis**

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	Team Leader		Vibram is aimed at ecodesign and environmental monitoring activities on the product and then on the entire production chain, leading at the same time to various methodological updates in the shoe rubber and sole sector. In an initial phase, a study was carried out on a reference compound for the factory Albizzate (Varese), the development of a reference standard under the scheme followed Environdec(PCR 2021:04 Rubber articles for footwear) and the next certification, therefore studies to identify ecodesign solutions for specific products. A tool has been created capable of tracking more than 400 compounds for the Albizzate plant and in extension to all Vibram plants and subcontractors worldwide (China, America, Italian subcontractors). This tool allows you to characterize product batches at the individual code level and at the same time carry out ecodesign actions to guide production.
2019 - 2023	Cnr ORI Martin SPA Italy Team Leader	Italy	**Development of environmental management system and dashboard for the dynamic representation of environmental impacts for ORI Martin SPA** - The activity with ORI Martin initially develops as a subcontract within the research project Steel 4.0. Initially, a preparatory study was carried out on the steelworks which led to the certification of four families of products under the scheme EPD. Subsequently, this study created the database to develop a Python tool capable of connecting plant data with environment profiles in a cradle-to-gate logic. Both data from management software (for example ERP and MES) and from automation and supervision systems are considered, accessible thanks to the centralized architecture. The processing of this data is implemented in a dashboard capable of providing dynamic monitoring and giving environmental KPIs for various certification schemes (CF,EPD,PEF,ISO 14004etc.), the development of this tool is in the industrial engineering phase for wider use in the steel sector.
2019 - 2021	Cnr Tenova Pomini SpA Italy Team Leader	Italy	**LCA study preparatory to certification on the EPD scheme for the machinery dedicated to Digital Texturing, Editing of the new Product Category Rule, Auditing, Publication and support for Certification for the Pomini Digital machinery**- The activity with Tenova Pomini initially involved an LCA (Life Cycle Assessment) study preparatory to certification on the scheme EP D(Environmental Product Declaration) for a machine PDT (Pomini Digital Texturing) for laser texturing of rolling cylinders in steel processing. In the absence of specific voluntary standardization, this activity led to the development of the former Product Category Rule (PCR 2021:10 Machine-tools for material working by removal of material by laser or similar) under the Environdec EPD scheme for surface finishing machines. Following the PCR submission process, the creation and coordination of a panel of experts was necessary. Upon publication of the PCR it was possible to modify the study and produce a set of specific tests for consumption, then certify the study and register it. To date, this study is the first at an international level in this category of capital goods.
2022 - Ongoing	Cnr Magic Srl Italy Team Leader	Italy	**LCA study for environmental impact assessment of absorbent material** LCA (Life Cycle Assessment) study based on the ISO 14044 scheme for an environmental impact study aimed at identifying environmental hotspots with a view to LCA attribution analysis.
2020 - 2021	Cnr Tenova SpA	Italy	**Assessment and update of the plant environmental impact monitoring tool** Assessment activities and the related update of the prototype tool for

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	Italy Team Leader		monitoring the plant's environmental impact, developed during the EIRES project.
2021-Ongoing	Cnr Univa Services Team Leader	Italy	**16-hour training course - Life Cycle Assessment (LCA) basis and application in the Food sector - Theoretical Course -** Fundamental theoretical aspects of environmental sustainability. Main contents: Introduction to the concept of environmental sustainability, Introduction to environmental certification and related management and communication, Type I, II and III certification, EPD certification, Discussion and case studies in the food sector - LCA methodology with Polimi. Main contents: Introduction to LCA, calculation criteria, allocation rules, case studies in the food world - Implementation of the LCA methodology with OpenLCA software. Main contents: Presentation of main databases and software, OpenLCA download and interface analysis, Download of a free database and structure analysis, Construction of a simplified LCA, Simplified examples of real case studies - LCA modeling with Cnr-IBE. Main contents: EPD modeling method, Modeling in the Food sector, PCR and specific rules, Modeling application cases
2019-2023	Cnr Footwear Polytechnic Team Leader	Italy	**Safe Project - Approaches and studies based on LCA for product and process sustainability in B2B and B2C in the context of fashion/footwear companies in the Brenta district -** Activity 1: Bibliographic study on good practices implemented by fashion/footwear companies: Analysis of the state of the art and literature. Identification of best practices in terms of sustainability implemented by companies in the fashion and footwear sector, with reference to players in the supply chain in both the B2B and B2C fields. Activity 2: Sustainability as added value in B2B and B2C. Analysis of the critical issues of production/distribution processes linked to sustainability. Reviews and interviews with key players in the district's companies regarding: corporate perception of consumers' sensitivity to environmental issues and their expectations referring to the B2C model, environmental services of interest to large groups referring to the B2B model. Activity 3: LCA modeling of processes of 2 fashion/footwear companies. Evaluation of existing/ex novo cases based on LCA approaches of target products of 2 companies in the district, aimed at identifying - and quantifying where possible - areas of improvement intervention from an environmental point of view on the two models of these companies in B2B and B2C. Activity 4: LCA evaluation of the impact of technological substitution. Evaluation of the environmental impact of new types of leather treated with biopolymers, compared to the life cycle of traditional target products in the portfolio of 2 italian companies.
2022-Ongoing	Cnr TIMESSWAPP SRL Team Leader	Italy	**Development of LCA-based tools for tertiary sector vehicular mobility -** Creation of a support activity for the development of a footprint calculation model in the vehicular mobility sector (private and public). In particular, the model should be able to allow a calculation of polluting emissions (mainly CO2, PM, NO2) for tracking the impacts generated by the movements of company employees towards the workplace (Home-work travel plan), aimed at collecting data aimed at allowing improvement actions in the management of home-office and home-school mobility. The aforementioned support activity aims to create a scalable application on mobile and fixed devices based on user data and sector studies contextualized to the environmental impact of the vehicular sector.

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2022-2023	Cnr ACBC SRL Team Leader	Italy	**LCA study for environmental profile comparison between two rain-boots for ACBC -** LCA (Life Cycle Assessment) study based on the ISO 14044 scheme for an environmental impact study aimed at identifying environmental hotspots with a view to LCA attribution analysis between two rain-boots, also including the documentary verification of a third party, aimed at producing a comparative environmental claim. Detailed activities: Product definition, Processing of forms aimed at data gathering compliant with ISO 14044, Compliance analysis with any additional schemes in the footwear sector, Collection of data and product information based on STIIMA forms, Verification and possible integration of the internal tracking system. Quantification of data and product information, aimed at pre-processing the two. Models, Verification of allocation criteria and mass balances, Verification of data sources, Definition of data quality (primary/proxy), Modeling and consolidation LCA analysis based on ISO 14044 scheme, Comparison analysis in relation to the main drivers of the ACBC product, Analysis final data quality, Sending LCA study report to the verifier, Verification meeting and detection of inconsistencies, Any changes to the study following the verifier's findings, Reception of verification report from the verifier, Drafting presentation of results, Drafting of environmental claims
2020-2022	Cnr AMBLAV Team Leader	Italy	**Plastic New Deal Project – Impact analysis aimed at replacing plastic with companies in the province of Como-Lecco -** Project in collaboration with the AMBLAV, Legambiente, Calvi SpA, Novatex SpA, Novacart SpA, Topglass SpA Activity 1- Collection of product and process data and information: Collection of data and information on the use of plastic based on the form provided by STIIMA, aimed at data gathering compliant with LCA methodology. Collection of information on traditional products through site visits and subsequent interaction with companies. Activity 2- Preliminary environmental impact assessment of plastic use. Qualification and quantification of data and information in relation to plastic use in the companies under examination and in the community. This activity requires the support of companies and Legambiente for the part (data from communities) according to interactions to be established based on the need for clarification of the data/processes. Activity 3 - Environmental impact assessment implementation of reduction measures. Modeling and carrying out LCA analysis related to ecodesign choices between communities and plastic use in factories. Activity 4- LCA Analysis Report - Report and presentation of results
2022-Ongoing	Cnr Gr3n SA Team Leader	Italy	**LCA analysis on granules obtained from depolymerized PET made at the Chieti production plant -** LCA (Life Cycle Assessment) study using the EPD (Environmental Product Declaration) methodological approach for granulates in reference to the Chieti production site. This offer is developed with a view to creating a first set of static data for a dynamic plant LCA and a first EPD certification of depolymerized recycled materialchoices between communities and plastic use in factories. Activity 4- LCA Analysis Report - Report and presentation of results
2020 - 2023	Cnr Industrie Chimiche Forestali SPA Team Leader	Italy	**Extension of LCA analysis on three families of fabrics for the Industrie Chimiche Forestali SPA production plant in Marcallo con Casone. Drafting of Product Category Rules (PCRs) and follow up of the EPD certification process-** Drafting of Product Category Rules (PCRs) and follow up of the EPD certification process for the Industrie Chimiche Forestali SPA product Activity 1: Drafting Product Category Rules (PCRs). Drafting of Product Category Rules (PCRs) according to the reference product category. Contact

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			with Environdec for the creation of a panel of experts. Management and moderation of the panel (minimum duration of 6 months) until the approval of the PCRs. Activity 2: Drafting of the Environmental Product Declaration (EPD). Drafting of the Environmental Product Declaration (EPD) starting from the methodological report of the study referred to in the introduction, with consequent modifications in compliance with the approved reference PCRs. Activity 3: Follow-up for certification at Environdec. DAP submission to Environdec, Contact with external auditor, Any changes to the study/DAP following the auditor's findings, Support for the definition of public material on the Environdec website Extension of LCA analysis based on EPD/PCR scheme certification 2799 "Impregnated fabrics" on extruded cotton, impregnated TNT and extruded TNT products for the Forestali production plant in Marcallo con Casone.
2015 - Ongoing	Cnr I.CE.C. Deputed Expert	Italy	**ICEC - Scientific expert at the Safeguarding and Impartiality Committee (CSI) -** The Impartiality Safeguarding Committee guarantees uniformity of treatment for those who apply for Certification according to the ISO/IEC 17021:2006. The committee's activities include discussions with stakeholders in the textile-fashion sector such as Leather workers, Assocalzaturifici, the SSP, the AIP to agree on a shared approach and updates on new certifications and delivery methods. The activity at I.CE.C was born in the study of footwear materials. The activities gave the opportunity to improve I.CE.C. processes. support for companies through periodic meetings, document examinations and the consequent modification of the impartiality management document with risk analysis and adopted solutions. As a further impact, the activity has given us the opportunity to collaborate with various players in the area of certification for textile-fashion, giving rise to both networking and dissemination that to enabling strategic activities.
2017 - Ongoing	Cnr UNI - Italian Standardization Body Deputed Expert	Italy	**UNI - Delegate for the CNR at UNI, participation in GL01 and GL15 of CT04 (Environment) and GL03 and GL04 of CT57 (Circular Economy) -** The ongoing activity first began in Environment Technical Commission CT04 and in particular in UNI/CT 004/GL 15 (Climate change) UNI/CT 004/GL 01 (Environmental management systems) was then concentrated more within the Circular Economy Technical CommissionCT57 from his birth linked to the creation of ISO/TC 323. Appointed liaison member with CT04, actively participates as an international expert and Italian delegate in the work of ISO/TC 323, for standard projects ISO 59004, ISO 59020, and ISO/TR 59031. At a national level he is among the promoters of the technical specification UNI/TS 11820:2022for measuring circularity in organizations and the technical report UNI/TR 11821:2023for the collection and analysis of good circular economy practices. He also participated in dissemination and promotion events for new initiatives. He has been candidate to an award for researchers of CEN-CENELEC Standards and Innovation Awards in 2020.
2021 - Ongoing	Cnr ESTEP ASBL European Technology Steel Platform Deputed Expert	Italy	**ESTEP - ESTEP participation as expert and Cnr-STIIMA representative -** ESTEP - The European Steel Technology Platform is an initiative aimed at improving the competitiveness of the European Union in the field of steel technology. Participation in joint papers or flagship papers, joint initiatives within Horizon calls, Networking, promotion of workshops and seminars and events for the dissemination of the principles of circular economy and sustainability in the world of steel, strategic training in some areas, joint

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			actions with other focus groups in particular the “Smart Factory” focus group, SRIA (Strategic Research and Innovation Agenda) elaboration, Organization of the 2024 Digital-4-Environment ESTEP workshop Roles performed Cnr-STIIMA Representative in the Steering Group and Implementation Group, Cnr-STIIMA Representative in the general Assembly, Expert participant in the Focus Group - Circular Economy
2006 - Ongoing	Cnr Italian LCA Network Association Deputed Expert	Italy	**RILCA - Participation in the Italian LCA Network – GDL Chemical Products and Processes Member of the Italian LCA network since 2006. Since 2019,** coordinator together with S. Maranghi of the Chemistry WG Mapping of the members of the WG and organization of the group thanks to the feedback received from each member active and/or registered in the Italian LCA Network. Analysis and updating of the work already carried out by the group and its members with the aim of involving new participants. Review of the national bibliography on the state of the art regarding applications of the LCA methodology to chemical products and processes in general. Planning of the work to be carried out with the members of the group with the aim of a publication on the state of the art that addresses and describes the potential of the LCA application to chemical processes and products, analyzing individual application cases. LCA evaluation of chemical processes and products and comparative analysis of existing processes towards potential innovations. Evaluation in the use of new raw materials in the chemical or energy industry. Organization of workshops and webinars on LCA in the chemistry sector. Training courses on LCA in the chemical sector for researchers and companies. The most relevant reference activities in the last four-year period were: • The creation of one publication of reference at an international level • The organization of webinars on the topic • The organization of advanced course for LCA in Chemistry • The organization of a progress workshop
2006 - Ongoing	Cnr Italian LCA Network Association Deputed Expert	Italy	**RILCA - Participation in the Italian LCA Network – GDL Chemical Products and Processes.** Member of the Italian LCA network since 2006. Since 2019, coordinator together with S. Maranghi of the Chemistry WG Mapping of the members of the WG and organization of the group thanks to the feedback received from each member active and/or registered in the Italian LCA Network. Analysis and updating of the work already carried out by the group and its members with the aim of involving new participants. Review of the national bibliography on the state of the art regarding applications of the LCA methodology to chemical products and processes in general. Planning of the work to be carried out with the members of the group with the aim of a publication on the state of the art that addresses and describes the potential of the LCA application to chemical processes and products, analyzing individual application cases. LCA evaluation of chemical processes and products and comparative analysis of existing processes towards potential innovations. Evaluation in the use of new raw materials in the chemical or energy industry. Organization of workshops and webinars on LCA in the chemistry sector. Training courses on LCA in the chemical sector for researchers and companies. The most relevant reference activities in the last four-year period were: • The creation of one publication of reference at an international level • The organization of webinars on the topic • The organization of advanced course for LCA in Chemistry

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			The organization of a progress workshop
2020-ongoing	Cnr MDPI Sustainability Deputed Expert	Italy	**Editor** Guest editor for two special issues Special Issue"Digital Transformation and Its Opportunities for Sustainable Manufacturing" with prof. Dr. Jonathan Sze Choong Low, Agency for Science, Technology and Research (A*STAR), Singapore Institute of Manufacturing Technology (SIMTech), and Dr. Mark Mennenga, Technische Universität Braunschweig, Institute of Machine Tools and Production Technology Special issue"Research Advances in Additive Manufacturing and Sustainable Industrial Engineering" with Dr. Francesco Tamburrino, Department of Civil and Industrial Engineering, University of Pisa, 56126 Pisa, Italy
2021-ongoing	Cnr MISE – Italian Ministry of Economic Development Deputed Expert	Italy	**MISE project evaluator** Technical Financial Evaluation of the following three projects Project 1- Innovation Agreement 31/12/2021 – Pos 40 presented by De Agostini Publishing SPA — Preliminary proposed evaluation as co-evaluator together with my colleague Danial Ramin. Review meetings, comment document on the proposal. Project 2- Sustainable Industry FRI DM 02/08/2019 pos 13 - Manteco SPA - Preliminary proposal evaluation, Request for integration to the proposal, Medium-term visit, Evaluation of the medium-term report Project 3- Agrifood Innovation Agreement DM 03/05/2018 pos 16 - presented by Salumificio Fratelli Beretta SpA - Preliminary proposal evaluation, Request for addition to the proposal, Medium-term visit, Evaluation of medium-term relationship with colleague Stefano Spinelli.
2011 - 2014	Cnr EC Team Leader	Italy	**Research programme: MYWEAR - Customized Green, Safe, Healthy and Smart Work and Sports Wear** Coordinator task 5.2: Innovative modular LCA and ecodesign solutions for green products development and assessment. The MY Wear project develops a new generation of personalized, ecological, and intelligent workwear and sportswear products for specific target groups. Three main activities were carried out in the project: firstly, we attempted to integrate LCA into the company's PDM (Product Data Management) through the development of an LCA database. The process involved collecting and analyzing data from different suppliers and creating a database made up of 50 modules that can be used to evaluate the environmental impact of footwear components. Secondly, a methodology was developed to integrate LCAs into enterprise design tools where such modules were integrated into a prototype CAD-CAM system for footwear. At the same time, the first international standard was developed to apply LCA to the product category of leather shoes (PCR 2013:15 Leather footwear) below the Scheme EPD International
2011 - 2013	Cnr EC Team participant	Italy	**Research programme: PROSUMER.NET - European Consumer Goods Research Initiative - Networking European Technology Platforms addressing Design-based Consumer Goods Industries and Related Research and Technology Fields** Participation in the following tasks: task 2.4 – Joint Strategic Research Roadmap, task 5.4 - Dissemination events at European, National & Regional level. Development of a strategic roadmap on research needs in the consumer goods sector in several phases: identification of pre-existing strategic documents on the consumer goods sector, selection of a foresight methodology suitable for the multi-sector application context, identification of emerging trends with direct or indirect effect on research priorities and possible solutions

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			through dedicated interviews with industrial experts and the dissemination of questionnaires for academic and industrial experts. The priorities that emerged and their implementation times were finally validated in two subsequent workshops, through verification questionnaires and with a final event. The roadmap defines twenty primary research objectives with related technology objectives and related cross-sector research areas.
2011 - 2013	Cnr EC Team leader	Italy	**Research programme: ADDFACTOR - ADvanced Digital technologies and virtual engineering for mini-Factories.** additive machines for advanced insoles and fashion components, for the production of insoles, heels and instant foot platforms; flexible and self-configurable production line. Coordinator task 7.7 - Sustainability impact evaluation of the innovative process and products by means of Scrap materials reduction and LCA tools Analysis of the impact that new technologies introduce compared to traditional supply chains. The impact assessment is carried out - at product level - characterizing the traditional product, therefore calculating the reduction in waste volumes, consumption per unit produced, the duration of use of the product and the reusability of these materials in other contexts. - at the supply chain level - estimating the variations in economies of scale linked to the characteristics
2011 - 2014	Cnr EC Team leader	Italy	**Research programme: FASHIONABLE - Development of new technologies for the flexible and eco-efficient production of customized healthy clothing, footwear and orthotics for consumers with highly individualized needs.** The FASHION-ABLE project provides European SMEs interested in customization with the technological means for the agile and eco-efficient production of customized products in response to the complex individualized needs of growing market niches outside the scope of mass-produced goods in terms of health and performance. Development of a cradle-to-gate LCA for new types of fabrics and high value-added materials to be used in new products. Creation of a database on 27 materials that integrates different environmental information in specific phases of the life cycle (preproduction, assembly, distribution and disposal) Development of a software tool for the distributed design of footwear which includes calculation of the environmental profile of the footwear according to the EPD standard based on the material entered in the bill of materials
2006 - 2007	Cnr EC Team participant	Italy	**Research programme: LEADERSHIP - Leading European RTD Sustained High Value Innovative Production for MANUFUTURE.** Contribution to the construction of the sectoral roadmaps on Wood and Leather Workpakage - "Roadmap in the manufacturing sectors" - Contribution to the definition of the overall Roadmap of the Manufuture Workprogramme "Ne production"The main result of the roadmapping work carried out within WP2 concerns the overall Roadmap of Manufuture in high technology and manufacturing sectors. WP2 “Roadmap in manufacturing sectors” (WP leader: E. Westkämper, FhG-VP)This had an impact on both:- The cross-sectoral Roadmaps that define RTD packages at a deeper level than that described by SRA Manufuture.- Impact of cross-sector technologies across sectors
2010 - 2013	Cnr EC Team participant	Italy	**Research programme: CORENET - Customer-Oriented and Eco-friendly NETworks for healthy fashionable goods** Participation in task 2.6 - LCA evaluation in distributed design - Creation of a methodology for product sustainability assessment that incorporates specific environmental indications reusable for product co-design.

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			Definition of a system for enhancing the environmental performance of the materials that make up the customized product. - Software tool to provide a rating for the manufacturer and then for the consumer before the product is actually assembled. The software tool uses supplier data through dedicated and updatable libraries. The data is reported in a standardized form. - Promotion of an international standard for defining the environmental impact of leather footwear. Product Category Rule - Environmental Product Declaration scheme - PCR 2013:15 Leather footwear http://environdec.com/en/PCR/Detail/?Pcr=8495
2013 - 2015	Cnr EC Team leader	Italy	**Research programme: NANOFOOT - Materials, Components and Footwear with enhanced comfort properties based on nanotechnologies - contract no. 606570.** - Alignment of data calculation methodology between the LCA methodologies for calculating the environmental profile of the product (EPD-footwear) and calculating the impact of individual nanoparticles (USE-tox) Calculation of USE-Tox indicator starting from tests carried out on biological samples on which 13 types of nanoparticles were applied. Data adaptation for the release of nanoparticles during use of the shoe and data adaptation in the LCA perspective. Examination of a typical case: shoe prototype that integrates different fabrics functionalized using ZnO. Release analysis during the disposal phase of functionalized footwear. Calculation of the overall effect referring to the entire life cycle of the footwear. Comparative LCA between vegan footwear (Camminaleggero) and leather footwear. Comparative LCA of two prototypes (non-functionalized leather shoe and non-functionalized leather shoe prototype)
2012 - 2015	Cnr EC Team leader	Italy	**Research programme: FACTORY ECOMATION - Factory ECO-friendly and energy efficient technologies and adaptive autoMATION solutions – contract no. 314804. -** Task 4.2 - LCA platform coordination. Creation of data infrastructure for integrating environmental impact assessment models with real-time data monitoring. Creation of data infrastructure for linking emissions and consumption by station or plant with independent information modules for environmental impact assessment. These independent information modules refer to LCA studies for recurring emissions and consumption. Creation of data infrastructure for connecting internal flow monitoring with health indicators for employees. Assessment models compliant with the main environmental and legislative standard schemes (ISO 50001, EN 16001, ISO 14001, ETS).
2013 - 2015	Cnr EC Team leader	Italy	**Research programme: FIDEAS - Smart Factory for Advanced and Sustainable Deproduction -** Coordinator of Activity 1.3 – Dynamic LCA analysis of performance and comparative environmental benefits Comparative LCA analysis of environmental impacts to calculate the real potential of de-manufacturing processes applied to a practical context: The additive impacts of the de-manufacturing facility are first calculated and linked with downstream processes for various types of PCBs The impact is compared with those of the upstream supply chain and with alternative de-manufacturing and recycling processes. Scenario analysis for the reference products (PCBs from electronic waste) in relation to the various recovery scenarios assuming a network of de-manufacturing plants on a regional scale.

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2003-2008	Private Sintesi ScPA Expert	Italy	**Private consultant -** Development of methodologies for the design of industrial production systems based on LCA and LCC within corporate projects. During this contract the following projects were followed in particular 2005-2008 - Plastal and Iveco - "Carrier" Project - "Production of large innovative components in the automotive sector" - Analysis of the environmental sustainability of new automotive components for the companies Plastal and Iveco SpA - Eco-efficiency analysis and comparative LCA for two structural components for large vehicles. 2005-2007 - Electrolux Home Products Italy SpA - STARFLAKES Project "New technologies for metal polymer-based paint for household appliances" - LCA comparison for the generation of sustainability indicators of an innovative coating process for white goods at Electrolux Zanussi SpA (Porcia, Pordenone) 2004-2006 - Aprilia-Piaggio SpA - Project "Eureka TWO: Two weel optimized" - OR 11: systems oriented to the life cycle and recovery of recycling materials and monitoring reconditioning - software to analyze eco-efficiency of moped design for Aprilia-Piaggio SpAhttps://cordis.europa.eu/programme/id/IC-EUREKA/it
2020-2023	Private SPIN 360 SRL Expert	Italy	**Private consultant -Critical Review 6 skin studies** Critical Review according to ISO 14040, ISO 14044 standards. Review activity compliant with ISO TS 14071:2014 with production of "Statement of Conformance". The LCA review activity is aimed at verifying that the methods used to perform the LCA are consistent with the ISO references and valid from a scientific and technical point of view. This activity has allowed us to analyze in detail various tanning processes on a global scale.
2018	Private COTANCE Confederation of National Associations of Tanners and Dressers of the European Community Expert	Italy	**Private consultant - Review PEFCR bovine leather as part of the pilot initiative for PEF** PCR review on bovine hides as part of the PEF pilot initiative. Product Environmental Footprint Category Rules Review (PEFCR) - Leather Pilot - Final Version. Technical, editorial and general review.