



Università di Foggia

Descrizione Progetti PRIN 2022 con PI UNIFG

1) Prof. Arena Fabio – titolo “One health genomics- study of antibiotic-resistant *Enterococcus* spp. from human infections, food-producing and wild marine animals”

*The increase of *Enterococcus faecium* (VREfm) infections poses serious challenges to global health. VREfm, in fact, exhibit a complex antimicrobial-resistance profile and a notable propensity to infect compromised hosts. Several studies have previously evaluated the population structure of VREfm causing infections in hospitalized patients but the nature and the origin of resistance and virulence genetic factors circulating among these strains have been only partially investigated. In this project we will use the WGS approach to better understand genetic relationship (especially transfer of resistance and virulence factors) between enterococci isolated from food animals/marine wildlife and VREfm isolates circulating within the hospitals as cause of infections. We will provide extensive data on genetic features of enterococci obtained from food animals (n. 25 shellfishes, n. 25 swines), marine wildlife (n. 50 sea turtles) and human clinical specimens (n. 100 blood and urine samples). Clonality, antimicrobial resistance and virulence genes content will be studied by next-generation sequencing approach. To further assess the spread capabilities of antibiotic resistance determinants and pathogenic traits, conjugation (in vitro and in vivo in the *Galleria mellonella* model) experiments will be carried out with a selection of strains. Taking into account the wide distribution of enterococci both in the environment and in animals and humans, understanding the differences in spread and genetic transfer could contribute to developing strategies aimed to reduce the diffusion of antibiotic resistance determinants and virulence traits. Moreover, our experiments will allow us to identify differences in transferability between the different populations of enterococci and increase the knowledge on genetic transfer of enterococci in different environmental conditions.*

2) prof.ssa Clemente Alida - titolo “Towards a Meta-Archive of Economic Expertise: Knowledge and Positive Law in Late Modern Experiments of Power (Kingdoms of Naples and Sicily)”

*The project, launched in 2018, intends to continue the construction of a 'meta-archive' of the expertise applied in the economic government of the Kingdoms of Naples and Sicily in the eighteenth century. This will be done through the systematic collection and publication of a type of document (the *Consulte*), generally aimed at providing the ruler with 'expert opinions' for the creation of norms at every level. In this way, the project examines a discursive method that was associated with decision-making processes in economic matters, placing it amongst the procedures and relationships that produced it: that is, the relationship between a power that tests new forms of governmentality in the sphere of the economy, characterized by an insurmountable contradiction between private interests and public happiness, and the knowledge and languages capable of neutralizing the interplay of interests involved in sovereign decision-making. We define this knowledge as expertise, that is, a competence based not on practice but on universalistic languages close to those of the Republic of Letters, but originating within the administrative apparatus, called to legitimize sovereign orders and linked to the production of late mercantilistic positive law. We believe that these documents testify to a process, albeit imperfect and discontinuous, of institutionalizing decision-making procedures that link the 'experiments of power' of the kingdoms of Naples and Sicily to their contemporary commercial monarchies, as attempts to construct forms of governmentality compatible with the aspirations of power to sublimate trade for the common good and to discipline private interests. The project has already produced the volume '*Consulte, rappresentanze, progetti per l'economia del Regno di Napoli. I. 1734-1739*', CNR, Rome 2021 (edited by D. Ciccolella, A. Clemente, B. Salvemini) as part of the 2015 PRIN "In Search of the Patriotic Merchant. Mercantilism, Economic Morality and Merchants in Mediterranean Europe*

(17th-19th centuries)", coordinated by Biagio Salvemini. Extension to the Sicilian consultative institutions is now proposed, and its continuation regarding the Kingdom of Naples, where in 1739, with the establishment of the Supremo Magistrato di Commercio, a process of strong institutionalization and supposed centralization of the advisory function began, which the study seeks to verify by measuring its impact on the markedly pluralistic structures of the first phase of Bourbon reformism. The proposal is part of a long-term project aimed at collecting and systematizing the consultative production for the entire Bourbon eighteenth century. Often scattered indiscriminately in diverse and disorganized archival collections, the documentation of consultants in the field of commerce represents an immense, unexplored documentary heritage, whose indexing is likely to have a significant scholarly impact on a wide range of areas of historical research.

Il progetto, avviato nel 2018, intende proseguire nella costruzione di un 'meta-archivio' dell'expertise applicata al governo dell'economia dei regni di Napoli e di Sicilia nel XVIII secolo, da realizzare attraverso la raccolta sistematica e la pubblicazione di una tipologia di documento (le consulte) tipicamente rivolto a fornire al sovrano pareri 'esperti' in vista della produzione di norme di ogni livello. In tal modo, il progetto indaga una modalità discorsiva connessa ai processi decisionali in materia economica, collocandola nelle procedure e nelle relazioni che la generano: quelle tra un potere che sperimenta nuove forme di governamentalità della sfera dell'economico, segnata da una invalicabile contraddizione tra interessi privati e pubblica felicità, e i saperi e linguaggi in grado di neutralizzare il gioco degli interessi coinvolti nella decisione sovrana. Definiamo questi saperi come expertise, ovvero una competenza non basata sulla pratica, bensì su linguaggi universalistici che si avvicinano a quelli della repubblica delle lettere ma che emergono all'interno della macchina amministrativa, chiamati a legittimare il comando sovrano e connessi alla produzione del diritto positivo tardo-mercantilistico. Crediamo che questi documenti testimonino un processo, pur imperfetto e discontinuo, di istituzionalizzazione di procedure decisionali che accomuna l'esperienza di governo dei regni di Napoli e Sicilia a quelle delle coeve monarchie commercianti, come tentativi di costruzione di forme di governo compatibili con le aspirazioni del potere alla sublimazione del commercio in pubblica felicità e alla disciplina degli interessi privati. Il progetto ha già prodotto il volume *Consulte, rappresentanze, progetti per l'economia del Regno di Napoli. I. 1734-1739*, CNR, Roma 2021, nel quadro del Prin 2015 *Alla ricerca del negoziante patriota*. Si propone ora l'estensione alle istituzioni consultive siciliane, e il suo prosieguo sul fronte del regno di Napoli, dove il 1739, con l'istituzione del Supremo Magistrato di Commercio, segna l'inizio di un processo di istituzionalizzazione forte e di presumibile accentramento della funzione consultiva che la ricerca si propone di verificare misurandone le implicazioni sugli assetti decisamente pluralistici della prima fase del riformismo borbonico. La proposta si inserisce in un progetto di lungo periodo rivolto alla raccolta e alla sistematizzazione della produzione consultiva all'intero Settecento borbonico. Oggetto di dispersione spesso casuale in diversi e disordinati fondi archivistici, la documentazione costituita dalle consulte in materia di commercio costituisce un immenso e inesplorato patrimonio documentario, la cui divulgazione è suscettibile di produrre un significativo impatto scientifico in una molteplicità di ambiti della ricerca e della riflessione storiografica.

3) Fanti Vera – titolo "Artificial Administrative Intelligence for territorial equality.

Operative Research over the Public Interest and the Protection of Persons in the face of the evolutions of the Digital Era".

This project aims to assess the possibilities of using some data science techniques, the increasing digitization of services, automated or AI related decisions, and analysis of Big Data, in various areas of administrative activity. The purpose is to connect these technologies with the structures of the public interest and of the substantive and procedural legal safeguards, in the administrative procedure and in the trial. The idea is to find the notion of Artificial Administrative Intelligence to analyze and understand the functioning of decision-making processes carried out through smart systems, both in the administrative proceeding and in the trial for the protection of individual rights. In this context, it seems necessary to find new rules for the administrative conduct (and indicators

for monitoring their implementation), useful to ensure good practice, impartiality, and transparency of the 'algorithmic' public action, as well as to prevent maladministration phenomena in the pre-decisional and decisional phases, carried out through or in conjunction with artificial-intelligence systems. It should be noted that the analysis of ethical-value profiles does not concern so much the issue of the digital or digitized administrative act, i.e. the acquisition of a 'digital-formal guise' of the administrative function, but rather the elaboration of legal rules that autonomously regulate the algorithmic administrative procedure, in order to guarantee the formal and substantial correctness of the entire decision-making process. The abovementioned research parameters, that enhance the algorithm as procedural and investigative organizational module, have a strategic relevance for the public administration and find, more recently, a wide space in the PNRR in which they are correlate with one of its three transversal priorities: the reducing of the North-South divide. This research faces the issues of digitization and AAI, through the original perspective of the necessary implementation of the constitutional principle of equality, in relation to the well-established divide between the centre-north of Italy and its South. The specific objectives are as follows: to define digitization, digital transition and legal limits of AI uses in some typical public administrative working fields and to extract general information that can be valid both for the general administrative function and the reduction of the structural divide – in terms of competitiveness, productivity, digitization and performing of public administrations – for an overall recovery of Southern Italy based on "digital cohesion". The research aims to produce – in addition to studies of each research unit, that are destined to publications – the drafting of a first outline of the Manifesto of the Administrative Artificial Intelligence for the territorial equality, that will be made available to all scientific communities (not only for the legal one) for each evolution.

Il Progetto intende studiare le possibilità di utilizzo di alcune tecniche della data science, la digitalizzazione, le decisioni automatizzate e/o legate all'impiego di Big Data, in alcuni ambiti dell'attività amministrativa, per connetterle con le strutture dell'interesse pubblico. L'idea è quella di mettere a fuoco una nozione di Intelligenza Amministrativa Artificiale (A.A.I.), utile per l'analisi e la migliore comprensione dei meccanismi di funzionamento dei processi decisionali compiuti attraverso i sistemi di digitalizzazione e automazione. Nella prospettiva considerata, appare necessaria la formulazione di regole di condotta amministrativa (e di indicatori di monitoraggio della loro attuazione) per assicurare il buon andamento, l'imparzialità e la trasparenza dell'operato pubblico "algoritmico", nonché a prevenire fenomeni di maladministration nelle fasi pre-decisorie e decisorie espletate con l'ausilio o attraverso sistemi di intelligenza artificiale. Deve evidenziarsi che l'analisi dei profili etico-valoriali non attiene tanto alla tematica dell'atto amministrativo digitale o digitalizzato, bensì all'elaborazione di regole giuridiche che disciplinino autonomamente il procedimento amministrativo algoritmico, richiedendo il rispetto di norme a presidio della correttezza formale e sostanziale dell'intero processo decisionale (e, ovviamente, del provvedimento che si pone, quale suo naturale e doveroso output). I parametri di ricerca scelti, che valorizzano l'algoritmo come modulo organizzativo procedimentale ed istruttorio, hanno rilevanza strategica per l'amministrazione e trovano, più di recente, ampio spazio nel PNRR, nell'ambito del quale si correlano con una delle tre priorità trasversali dello stesso piano: la riduzione del divario di cittadinanza. La ricerca intende quindi affrontare il tema della digitalizzazione e dell'intelligenza artificiale nella PA attraverso il prisma originale della necessaria attuazione del principio costituzionale di uguaglianza, specie sotto il profilo del divario ormai cristallizzatosi tra centro-nord e Mezzogiorno del nostro Paese.

Gli obiettivi specifici consistono nel definire i limiti giuridici per la digitalizzazione, la transizione digitale e l'utilizzo dell'AI in alcuni ambiti di lavoro tipici dell'amministrazione pubblica ed estrarne indicazioni generali valide sia per la funzione amministrativa in generale, che per la riduzione del divario strutturale oggi esistente in termini di competitività, produttività, livello di performance delle amministrazioni pubbliche e digitalizzazione, per un rilancio complessivo del Mezzogiorno fondato sulla "coesione digitale". I risultati della ricerca, oltre ai prodotti di studio generati da ognuna delle unità di ricerca, tenderanno anche alla costituzione di una prima bozza di Manifesto dell'intelligenza amministrativa artificiale per l'uguaglianza territoriale, da offrire alle comunità scientifiche, non solo nelle discipline giuridiche, per ogni evoluzione.

4) prof. Corso Gaetano - titolo "Lipidomic characterization of cell membranes and body fluids of patients with Alzheimer's disease and interaction with the phosphorylation status of Amyloid Precursor Protein"

Worldwide, Alzheimer's disease (AD) is the leading cause of dementia affecting over 30 million people over the age of 65 years. However, it is only possible to make a diagnosis when the neuronal damage is already advanced, making treatment difficult to slow or minimize the symptoms of AD. Therefore, there is an urgent need to develop both new diagnostic and therapeutic strategies to combat AD. The extracellular accumulation of amyloid-beta (Abeta) peptides is one of the specific signs of AD. The production of Abeta derives from the amyloid precursor protein (APP), which depends on the phosphorylation of the Tyr 682 residue to be processed and trafficked in the acid cell compartments. However, this process also depends on the lipid composition of the cell membranes. So far, there is still no clear evidence on the influence between the qualitative and quantitative lipid composition of cell membranes and the interactions with the proteolytic processing of APP in AD patients. In this project, we aim:

(i) to validate the method we have developed to measure the levels of phosphorylated APP Tyr682 in the mononuclear cells of patients with AD, as well in patients showing signs of cognitive impairment (MCI) and in healthy controls (HC);

(ii) to analyze by mass spectrometry (MS) the lipids composition in the membranes of blood cells (white blood cells and erythrocytes) in AD, MCI, and HC;

(iii) to analyze also the lipid levels, by MS, in plasma of AD, MCI, and HC;

(iv) to establish the potential relationships/interactions between the levels of APP Tyr682 phosphorylation and the lipid composition in cell membranes as well in plasma.

- The project outcomes could lead to innovative clinical perspectives for diagnosing and managing patients with AD and those with early symptoms.

5) prof.ssa De Lucia Caterina - titolo "UNderstanding energy COmmunity maRkets for the development of inNer and protected areas"

This project stems from the need to tackle the urgent issue of energy transition, understood as the construction of a new model of social organization based on the production and consumption of energy from renewable sources. The energy transition has sparked researchers to reconceptualise what an energy system looks like with the debate focused on the opportunities for reconfiguration of the responsibility between participating actors (Brown et al., 2019; Wolsink, 2020). In such a scenario, the activation of new forms of collective action and collaborative economies constitute the cornerstones of the energy transition, as well as an opportunity for new green economy models. Renewable technologies have made possible the spread of renewable energy communities (RECs) which support a localised, new distributed conception of energy production, management, and consumption (EU Directive Red II 2018/2001). In addition, the engagement of different actors within the context of RECs has led to the emergence of energy citizenship as a new topic for research agenda and practical applications (Mihailova et al, 2022). The latter considers citizens like prosumers, i.e active consumers that consume and produce renewable energy within an energy community. Within this system, energy can be used, fed into the network, exchanged with other prosumers or accumulated in special systems and returned to the consumption units. The strengthening between the enhancement of the local territory and social objectives of the Red II Directive, offers the opportunity for protected and inner areas of the Italian territory (CIPE, 2015, 2016, 2017, 2018, 2019) to play an important role in the practical implementation of RECs. These areas are territories characterised by an inadequate supply of or access to essential services to ensure a certain level of wellbeing (European Commission, 2014, 2015). From the energy point of view, these areas suffer from high costs and multiple operating issues. In these settings, the concept of energy sovereignty (World Development Movement, 2015) exerted by the prosumer provides the establishment of sustainable development models. Given the above, this project investigates the opportunity for inner and protected areas of the Gargano, in the region of Puglia, to implement RECs. Four objectives the proposal intends to achieve. From the supply-side: 1. A socio-economic and energy market analysis of the studied areas; 2. The

definition of Best Available Technologies, to enhance existing and future renewable energy plants, and associated costs and benefits. From the demand-side: 3. Mapping of all interested stakeholders and modelling of their behaviours. From both the demand and supply side: 4. A definition of adequate RECs project planning and strategies for the practical implementation of the National Recovery and Resilience Plan (PNRR) especially in relation to Investment 1.2, Mission 2, Component 2, in the municipalities of the studied areas.

6) prof. Muscio Alessandro - titolo "Women's inclusion in innovation and entrepreneurship"

This project investigates gender issues in innovation and entrepreneurship activity. Theories across economics, sociology, and gender studies suggest that the antecedents of this gender gap is rooted in complex and interrelated factors. While some studies propose that the gap originates in early childhood, progressing through high school and tertiary education choices, others suggest that structural factors such as family and career roles are more responsible. We will combine theories and methods across fields to assess the causes and propose actions to reduce the gender gap in entrepreneurship and innovation. A better understanding of the extent and causes of the gender gap in these areas is important. Although women and men have comparable intellectual capacities and educational attainment, women still face greater obstacles to career success than men. These obstacles include unequal opportunities and standards of assessment. The consequences include inefficiencies in the labour market and reduced social wealth and justice. Achieving gender equality in the labour market in skilled jobs such as innovation and entrepreneurship has become a priority for modern societies (European Commission 2020). Furthermore, ongoing research suggests that women can bring novel perspectives and mindsets to entrepreneurial ventures (Dezsö & Ross 2012), especially in the case of innovation-led enterprises. Therefore, addressing the gender gap in entrepreneurship and innovation is dictated by scientific research and its implications for policy and managerial actions. We study this critical issue by both consulting existing databases and collecting novel data that tracks the entire career trajectory of men and women, with a focus on science and technology professions, and in setting up entrepreneurial ventures. This extensive data collection exercise will allow us to solve well-known selection issues that arise when studies focus on individuals who become scientists, inventors, and entrepreneurs. Thus, by going beyond research that observes realized outcomes, we can measure at which stage the gender gap originates and what types of solutions are likely to be most effective in reducing this gap. We will focus on a large, entrepreneurship-oriented country such as Italy, and special emphasis will be put on women's transition from academia to industry. Our proposed findings aim at offering managerial and policy-based suggestions to mitigate the gender gap in these contexts. The research team is well-balanced in terms of research competencies in the area of entrepreneurship and innovation. All participants have advanced competencies in data-collection and in econometric analysis. Moreover, they share a keen interest in analysing the gender gap in different contexts, from startup activity to students' entrepreneurship, and in willing to provide useful insights for the design of better managerial practices and policy initiatives.

7) prof.ssa D'Onghia Madia - titolo "Exploited labour. An interdisciplinary research on the politics aimed at preventing labour exploitation"

The EXPLOIT (Exploit-ed Labour) project deals with exploited labour and aims to develop effective policies for the prevention of the phenomenon. As will be seen better later, it is an innovative project in terms of methodology (interdisciplinary, intersectoral and related to the entire national territory), subject of the research (multidimensional and multi-factorial approach to labour exploitation) and final results (video reportage and digital handbook). Assuming that labour exploitation is not a residual nor a transitory feature of the labour market but a structural one, EXPLOIT tackles this phenomenon by applying an interdisciplinary methodology. In this context, the 4 research units, coordinated by the University of Foggia, will pursue a double goal:

1) on one side, they aim at highlighting the structural factors causing exploitation and the contradictions of merely punitive policies designed for fighting against it;
2) on the other side, they will critically reflect on the capacity of labour law - as a normative result of its policies and in combination with other legal disciplines (criminal law, commercial law, private law, philosophy of law) - of guaranteeing an effective preventive protection against exploitation. Although labour law and worker rights' protection are central to this research, the choice of an interdisciplinary methodology confers to the research a dynamic perspective that involves a wide range of professionals and stakeholders and aims at elaborating tools and solutions to prevent and contrast labour exploitation.

EXPLOIT will combine the theoretical study of labour exploitation with case studies with regard to the sectors in which the phenomenon is mostly present in the territories covered by the various research units. To this end, the first 2 months of the project will be devoted to the selection of the relevant production sectors and, within them, of the case studies to investigate. In the following 12 months, the selected cases will be analysed, through quantitative/qualitative research methods, by the Research Units, acting in constant interaction with each other and exploring the dimension and the complex characteristics of the phenomenon. Starting from these first findings, policy strategies and legal sources on labour exploitation will be analysed, in order to assess their contradictions and criticalities in a logic of prevention (rather than repression) of the phenomenon. The last 10 months of the project will be devoted to the preparation and dissemination of a video reportage and a digital handbook for the prevention of labour exploitation (hereinafter Digital Handbook), in which the outcomes of the research will be presented.

EXPLOIT (acronimo di Exploit-ed Labour) è un progetto dedicato al lavoro sfruttato, il cui obiettivo è di pervenire all'individuazione di policies efficaci per la prevenzione del fenomeno. Si tratta, come meglio si vedrà, di un progetto innovativo per metodologia (interdisciplinare, intersettoriale e relativa all'intero territorio nazionale), oggetto della ricerca (approccio multidimensionale e multi fattoriale allo sfruttamento lavorativo) e risultati finali (Video reportage e Manuale digitale). Sul presupposto che lo sfruttamento lavorativo sia ormai un dato strutturale, e non invece, residuale o transitorio all'interno degli odierni contesti produttivi, EXPLOIT propone una ricerca dal taglio interdisciplinare, nel cui ambito le 4 Unità di progetto, sotto il coordinamento del team afferente all'Università di Foggia, opereranno lungo le seguenti due direttrici:

- 1) far emergere i problemi strutturali che sono causa dello sfruttamento e le contraddizioni tra policies prettamente punitive, messe in campo per contrastarli;
- 2) riflettere criticamente sulla capacità del diritto del lavoro di garantire un'effettiva tutela preventiva contro lo sfruttamento in connubio con altre discipline giuridiche (il diritto penale, il diritto commerciale, il diritto privato, la filosofia del diritto).

Pur se l'ambito lavoristico relativo alla tutela dei diritti dei/lle lavoratori/trici resta centrale in questa ricerca, la scelta di un approccio interdisciplinare esplicita la chiara intenzione di pervenire all'individuazione di una prospettiva dinamica di prevenzione del fenomeno, capace di coinvolgere un'ampia platea di interlocutori e di portatori di interessi nell'elaborazione di strumenti e soluzioni a riguardo.

A tal fine, EXPLOIT propone una ricerca che allo studio teorico della materia sappia affiancare altresì un'indagine sul campo, riferita - nei territori coperti dalle diverse unità di ricerca - ad almeno alcuni dei settori entro cui il fenomeno si concentra. Al tal fine, i primi 2 mesi del progetto saranno dedicati alla selezione dei comparti produttivi e, al loro interno, dei casi studio oggetto di attenzione. La ricerca proseguirà, poi, nei successivi 12 mesi, con un'analisi quanti/qualitativa - da parte di tutte le Unità di ricerca, in costante interazione tra loro - dei singoli casi selezionati, esplorando la complessità del fenomeno e specificandone dimensioni e caratteristiche. Alla stregua delle risultanze così prodotte, si guarderà alle policies e ai relativi precipitati normativi in materia per valutarne contraddizioni e criticità in una logica di prevenzione (più che di repressione) del fenomeno. Gli esiti della ricerca confluiranno, infine, all'interno di un video reportage e di un Manuale digitale per la prevenzione dello sfruttamento lavorativo (d'ora in poi Manuale digitale), alla cui predisposizione e disseminazione saranno dedicati gli ultimi 10 mesi del progetto.

8) prof.ssa Indrio Flavia - titolo "AN APP TO SHED THE LIGHT ON THE WINDOW OF OPPORTUNITY OF THE FIRST 1000 DAYS OF LIFE"

Over the past half century, the global health landscape has dramatically changed. Previous causes of mortality and poor health have been replaced by an epidemic of noncommunicable diseases (NCDs), particularly cardiovascular diseases, cancers, chronic respiratory diseases, stroke, overweight and obesity, and its morbidity consequences, including diabetes. The occurrence of these diseases depends on several factors. In addition to genetic predispositions, lifestyle also has an influence. Prevention must be the cornerstone of the global response to NCDs. The factors and mechanisms that predispose individuals to these long-term effects need to be clarified and knowledge can decrease or even prevent these diseases. Our project aims to develop an App that will measure all risk factors for NCDs starting in pregnancy and through the first thousand days of infants' lives. In order to gather valuable data that could help to gather novel and useful information from the patient cohort, we will develop a user friendly app based on the latest HCI (Human Computer Interaction) models developed at University of Naples in Cooperation with Apple Academy that will guide the person through a personalized experience to let them be motivated in providing correct and complete data. The collected data will be then used to run a continuous AI based process that will provide immediate feedbacks to the user and new knowledge to be leverage at the medical side in order to prevent eventual disease before a well known and dangerous symptom may occur. A large database will be created that will allow numerical analysis of variations in the incidence and frequency of various parameters such as breast-feeding, respiratory and gastrointestinal infections, use of antibiotics, lifestyle etc. The database will be analyzed by artificial intelligence software. All this information, analyzed together, will build up a fairly clear picture of the potential of precision medicine and the project's objectives to safeguard the future of young patients.

Nell'ultimo mezzo secolo, il panorama sanitario globale è cambiato radicalmente. Le precedenti cause di mortalità e cattive condizioni di salute sono state sostituite da un'epidemia di malattie non trasmissibili (NCD), in particolare malattie cardiovascolari, tumori, malattie respiratorie croniche, ictus, sovrappeso e obesità e le sue conseguenze sulla morbilità, incluso il diabete. L'insorgenza di queste malattie dipende su diversi fattori. Oltre alle predisposizioni genetiche, anche lo stile di vita ha un'influenza. La prevenzione deve essere la pietra angolare della risposta globale alle malattie non trasmissibili. I fattori e i meccanismi che predispongono gli individui a questi effetti a lungo termine devono essere chiariti e la conoscenza può ridurre o addirittura prevenire queste malattie. Il nostro progetto mira a sviluppare un'app che misuri tutti fattori di rischio per le malattie non trasmissibili che iniziano durante la gravidanza e durante i primi mille giorni di vita dei bambini. Al fine di raccogliere dati preziosi che potrebbero aiutare a raccogliere informazioni nuove e utili dalla coorte della paziente, svilupperemo un'app facile da usare basata sull'ultima HCI (Human Computer Interaction) modelli sviluppati presso l'Università di Napoli in collaborazione con Apple Academy che guideranno la persona attraverso un'esperienza personalizzata per renderla motivata nel fornire dati corretti e completi. I dati raccolti verranno quindi utilizzati per eseguire un processo continuo basato sull'intelligenza artificiale che fornirà feedback immediati all'utente e nuove conoscenze da sfruttare sul lato medico al fine di prevenire eventuali malattie prima che si verificano sintomi ben noti. Verrà creato un ampio database che consentirà l'analisi numerica delle variazioni nell'incidenza e nella frequenza di vari parametri come allattamento al seno, infezioni respiratorie e gastrointestinali, uso di antibiotici, stile di vita ecc. Il database sarà analizzato da software di intelligenza artificiale. Tutto queste informazioni, analizzate insieme, costruiranno un quadro abbastanza chiaro del potenziale della medicina di precisione e degli obiettivi del progetto per salvaguardare il futuro dei giovani pazienti.

9) prof. Pannone Giuseppe – titolo "Identification of new relevant stromal subpopulation into oral cancer microenvironment"

Cancer cells are known to require tissue perturbation in order to generate a suitable supportive The tumor microenvironment (TME), which is an important factor in cancer biology. TME is made

up of cellular and non-cellular components that surround cancer cells and is known to influence key aspects of cancer development such as tumor growth and therapeutic response. Furthermore, TME is critical in establishing a favorable environment that supports metastases onset (e.g. metabolic support, growth factor, angiogenesis, immunological privilege, etc). However, a complete understanding of TME heterogeneity, as well as the mechanisms by which it promotes tumor initiation, progression, and metastasis, remains elusive. As a result, the ability to spatially locate and isolate the cells surrounding a cancer cell of interest in vivo may aid in understanding the complex changes that occur during TME formation. Among different types of cancer, oral squamous cells carcinoma represent a very disabling and hard to treat cancer, especially because of a high frequency of recurrence and locoregional metastases. In this scenario, a detailed understanding of those components of TME which support progression and metastases is necessary to develop more efficient therapies. In this project we will address this issue by utilizing a recently developed system that allows for the identification and isolation of cancer neighboring cells. Using this neighboring-labeling system in an orthotopic model of oral cancer, we will isolate and characterize the various cell populations found in the oral cancer TME, with the goal of identifying new cell populations involved in tumor progression, chemoresistance, and metastasis initiation.

10) prof. Zaza Gianluigi – titolo “DEvelopment and TEsting of an artiFicial intelligence Tool for predicting end-Stage kidney disease. DETECT STUDY”

In the last years, artificial intelligence (AI) techniques are demonstrating great potential in risk prediction and early detection of chronic non-communicable diseases (NCDs) (1). Among these, chronic kidney disease (CKD) is now considered a leading public health problem worldwide with a global estimated prevalence of 11.1%, corresponding to 850 millions of people, and a growing prevalence of patients with end-stage kidney disease (ESKD) needing renal replacement therapy that is projected to more than double by 2030 (2,3). Such technologies may not be anticipated to replace the nephrologists' medical decision-making, but can definitely assist them in providing optimal personalized diagnosis and therapy for CKD patients (4).

The clinical applications of AI in progression to ESKD can be broadly categorized into three main topics: (a) predicting events; (b) providing treatment and clinical decisions; and (c) identifying disease patterns/clusters of patients (based on risk factors). At present, the use of prediction models in treating CKD patients is still in its infancy and further evidence is needed to identify its relative value (4,5).

However, despite these assumptions, while AI applications are relatively common in fields like ophthalmology (6) and cardiology (7), its use is still scarcely reported in nephrology and well-standardized and clinical employable predictive algorithms in nephrology are still missing.

Therefore, in our project (in line with the strategic priorities of PNRR), we will apply several machine learning (ML) algorithms to predict clinical progression to ESKD (with initiation of dialysis treatment) analyzing the initial trajectory of some (known) clinical variables measured overtime.

This could allow us to identify high-risk patients that would benefit from preventive strategies and rapid clinical/pharmacological interventions (e.g., nutritional therapy, multi-drugs treatment optimization). Additionally, this research strategy could help to identify specific patterns of multi-morbidity thus improving stratification of the CKD population according to their clinical risk.

Furthermore, this strategy would allow the optimization of resources allocation.

To this purpose, our project will aim:

- 1. To develop a multi-parametric predictive clinical model for progression of CKD to ESKD (DETECT-CLIN MODEL);*
- 2. To integrate the best risk model in a Mobile App Device (DETECT-APP);*
- 3. To test the performance of the DETECT-CLIN MODEL for ESKD in a longitudinal study;*
- 4. To build (and test in a longitudinal study) a mixed integrated clinical-biological predictive model (BIOCLIN-DETECT MODEL) for ESKD by integrating the best clinical model with additional biomolecular features (i.e. urinary noninvasive biomarkers).*

To achieve these objectives, the project will be split into 4 WPs and it will involve 3 different nephrological research centers in Southern Italy (from UniFG, UniBA and UniNA).

11) prof.ssa Marinelli Chiara Valeria - titolo "Clinical markers of linguistic and literacy vulnerabilities in adulthood: it's never too late!"

This project aims primarily at evaluating the language and literacy difficulties (henceforth L&Ld) in adults with a vulnerability due to the lack of stimulation through the acoustic-phonological input (in the deaf population), the linguistic input (in minority language/bilingual speakers) or to the presence of a Specific Learning Disorders (henceforth SLD), attending Universities or vocational high schools. Secondly, the project intends to assess the effectiveness of a pedagogical intervention targeting the school context to identify educational practices able to foster the development of learning abilities by preventing the risk of dropouts and supporting academic achievements in vulnerable students.

Therefore, the general purpose is to identify a set of discriminant markers of L&Lds in adulthood, employing a series of ecological and functional tasks to improve the understanding of these skills over and above compensatory strategies. To do so, we will use a range of tasks for the evaluation of linguistic comprehension and production, reading, spelling and written composition in adulthood, that will allow an examination of lexical, phonological, semantic and morphosyntactic skills in a population for which dedicated tests are not yet available in Italy. In this way, our research will offer an exhaustive evaluation of sources of difficulties among vulnerable populations, for which evidence is currently lacking. Additionally, these tasks will possibly serve as a starting point for creating a standardized battery of tests. In light of the results, we will further implement pedagogical practices of intervention targeting teachers to favour a better recovery of the areas of vulnerability in students and the best realization of their human capital within the school curriculum through the promotion of self-evaluation and self-monitoring strategies both in teachers and students.

The three units will accomplish these aims by exploring different but complementary aspects of literacy: Unit 1 will focus on the reading of single words and sentences and lexical, semantic and morphosyntactic variables affecting decoding; Unit 2 will focus on syntactic production and comprehension as well as on phonological and syntactic processing; Unit 3 will focus on spelling and written composition abilities, with the exam of psycholinguistics characteristics of the written compositions. Additionally, Unit 2 will implement and test the efficacy of pedagogic interventions aiming at training teachers to acquire best practices. As a result, we will conceive a series of best practices that could be proposed as guidelines for evaluating and auto-evaluation of areas of risk within the school curriculum by teachers and students.

12) prof. Capitano Nazzareno – titolo "Interplay Between Cognitive Functions, Metabolism and Circadian Rhythms: from Molecular Characterization to Dietary Modulation"

Recently, both scientists and public administrators are making several efforts to point out strategies aimed at sustaining and enhancing cognitive functions to improve successful academic records in young students. Among the many factors influencing the different study-performances of students, physiological and biochemical characterization of their cognitive process is receiving increasing attention. In the past few years several dietary components have been identified as having effects on cognitive psychology and neuropsychology impacting on the brain metabolism and the neurotransmission regulation. A further element gaining increasing attention is the time-of-day fluctuations in behaviour and physiology under the control of a circadian clock genes machinery. Circadian rhythms encompass a wide range of cognitive tasks such as attentional capacities, executive functioning, and memory.

This project aims to explore if the cognitive performances in students undergo changes at different time of the day depending on the individual chronotype, and, in addition, if administration of controlled isocaloric low-carbohydrate ketogenic diet improves them. Metabolomics analysis in students' sera before and after the ketogenic diet administration will be performed in parallel to and integrated with psychometric evaluations. Furthermore, in keeping the emerging evidence of the influence of dietary factors on the microbiota-gut-brain axis, that in turn plays a role in the circadian

regulation of host physiology, we will explore if and how ketogenic diet affects the gut microbiome function and composition in young students. In addition to young students a mirrored experimentation will be carried out in a murine model integrating behavioural observations with *in vivo* electrophysiology of selected brain areas, blood metabolomics and gut microbiome evaluation.

Finally, to disentangle the molecular mechanism underlying the effect of the ketogenic diet on the neurocognitive functions, metabolites related to it, as suggested by the metabolome analysis, will be tested *in vitro* on the process of neurogenesis of human iPSC-derived hippocampal neurons, known to be fundamental for human cognition. This part of the project will focus on the mitochondria-related functions and on the metabolism of neurotransmitters and will be integrated with information from transcriptomic analysis.

The results of the presented project will provide helpful insights to set novel educational strategies with overt sustainable socio-economic repercussions in line with the recommended objectives in the agenda of the Horizon Europe work program.

13) prof. Elia Antonio – titolo “Tuning of a sustainable cropping model for the production of bioactive compounds in *Cynara cardunculus* var. *altilis*”

Cynara cardunculus L. includes globe artichoke (var. *scolymus*), cultivated cardoon (var. *altilis*) and their progenitor wild cardoon (var. *sylvestris*). Cultivated cardoon (CC) is the most productive in terms of aboveground biomass and bioactive compounds accumulation. CC is well adapted to the arid and semi-arid Mediterranean areas, where its cultivation is performed under minimal external inputs due to its deep root system. Alongside the traditional food utilization, CC is exploited for the extraction of natural bioactive compounds (NBCs), such as polyphenols and sesquiterpene lactones. Previous studies demonstrated that CC leaf extracts possess a broad range of pharmacological properties, but their accumulation and composition is affected by genotype, plant tissue, growth stage as well as biotic and abiotic factors. Furthermore, it has been highlighted that root symbiosis with arbuscular mycorrhizal fungi (AMF) may promote plant growth by increasing the uptake/translocation of nutrients and water, as well as influencing the quantity and quality of NBCs. All these factors are responsible for wide variability in the quantity and qualitative profiles of NBCs extractable from CC leaves. It is thus crucial to tune the best agricultural practices and shed light on the genetic mechanisms activated by AMF symbiosis. BioAtilis is aimed at setting up an eco-friendly cropping model based on low external inputs (irrigation and fertilization) and high planting density of an already available genotype of CC (i.e. ‘Atilis 41’) previously selected for its high biomass production and leaf NBCs content. ‘Atilis 41’ plants cropped at two densities and inoculated or not with AMF, will be compared for the quantity and quality of NBCs, as well as for biomass yield. The evaluation will be performed in two environments (Sicily and Puglia), over two growing cycles and at different harvesting times. To investigate the molecular processes involved in the AMF symbiotic mechanism and NBCs production, transcriptomic studies will be performed in root and leaf tissues of colonized and control plants grown in a greenhouse and under controlled environmental conditions. These studies will be optimized by obtaining a high-quality genome sequence of the selected cultivated cardoon genotype.

Through a multidisciplinary approach, the BioAtilis project will identify the best eco-sustainable cropping model for exploiting cultivated cardoon as NBCs producer, it will shed light on the genetic mechanisms involved in the quantitative and qualitative production of NBCs following AMF inoculation and will provide fundamental knowledge for future breeding programs.

14) prof. Germinara Salvatore Giacinto – titolo “Biological, chemical and genetic bases of granary weevil and purple wheat interactions”

The granary weevil, *Sitophilus granarius* (L.), is among the most destructive pests of stored grains causing severe quantitative and qualitative losses. The control of this pest relies on the use of fumigants and broad-spectrum contact insecticides, but due to the impacts of synthetic pesticides

on health, food safety and environment, there is an urgent need for a more sustainable and low-impact control approach. The development of resistant wheat varieties is one of the most promising alternatives to insecticides in the integrated management of stored grain pests. However, the sources and mechanisms of host-plant resistance to *S. granarius* in wheat are largely unknown. Poor are the information on the mechanisms involved in the olfactory and feeding response of adult insects to host plant; limited are the numbers of wheat genotypes surveyed for resistant factors; insufficient are the literature reports on constitutive or induced resistance genes to *S. granarius* in wheat. Previous studies showed that granary weevil adults are able to perceive and behaviourally respond to a range of wheat grain volatile organic compounds (VOCs). Further evidences showed that, differently from yellow wheats, some Ethiopian purple wheats are unattractive to *S. granarius* adults due to their specific VOCs composition. The present proposal has the ambition to gain a deeper insight into the defense mechanisms of purple wheat against *S. granarius* by focusing on the overall potential biological, chemical, and genetic factors involved in the host finding and host acceptance by adult weevils. In this overall aim, the project will take advantage of a set of durum and bread wheat Near-Isogenic Lines derived from heterogeneous inbred families contrasting for the colour of the pericarp due to the diverse anthocyanin composition and content. We will characterize these lines at any level up to identify the key grain components involved in the insect-host plant interactions. The olfactory response of the granary weevil to VOCs emitted by purple and yellow grains will be evaluated by using electroantennography (EAG) and olfactometer behavioural bioassays. The insect fitness on intact grains will be evaluated by calculating development parameters, whereas using flour disk bioassays, food deterrence and nutritional indexes (Food Deterrent Index, FDI; Relative Consumption Rate (RCR), Relative Growth Rate (RGR), and Efficiency Conversion of Ingested Food, ECI) will be determined in response to whole wheat flour and refined wheat flour enriched with phenolic fractions or their individual main components of purple and yellow wheat genotypes. We will use next generation technologies (NGS) to search for molecular markers (SNPs and INDELs) associated to the key variants, and we will refer to both the durum and bread wheat reference genomes and to their respective transcriptomes to identify the target genes that significantly change their expression level within each NIL pair.

15) prof.ssa Conte Amalia – titolo “Exploitation of fruit by-products of Mediterranean countries for developing compatible, biodegradable, and sustainable active pads, intended for food packaging applications”

Recently, academics, industries, and consumers have gained awareness of the impact of agri-food practices on economy, environment, and human health. These concerns have oriented the food sector towards the adoption of sustainable measures, paving the way to a greener era in production, transport and packaging. One of the main pillars of this multifaceted process is the valorization of fruit by-products as sources of added-value compounds to formulate novel polymeric food packaging, resulting in multi-dimensional advantages starting from waste valorization to ensure food safety and ending in the implementation of a fully biodegradable material. Phenols present in fruit peels, skins, roots, and seeds may delay oxidation processes and microbial growth thus prolonging food shelf life, whereas phenolic polymers such as lignin may act as fillers able to improve mechanical and barrier properties of the polymeric matrix. This especially applies to biopolymers such as polysaccharides and proteins that, despite having innate potential in forming continuous and cohesive polymer networks, possess several limitations regarding the structural integrity of the final materials. Despite the considerable interest, a systematic investigation of the extraction procedures and functional properties as well as of the incorporation strategies into the polymer matrix of fruit by-product derived phenolic compounds for a rational implementation of active materials is apparently lacking in the literature. In this context, the present project is aimed at developing new sustainable active pads for food packaging applications. The attention will be focused on winery and olive pomace, and pomegranate and prickly pear peels, as by-products abundant in Mediterranean area whose valorization will provide relief to both agri-food processing industries and environment. Phenolic compounds to be used as active components and lignin to be used as filler in the polymeric matrix will be recovered under environmentally

friendly conditions. The antimicrobial, antioxidant and cytocompatibility properties of by-products and their extracts will be systematically investigated, after that polyvinyl alcohol, gelatin and alginate-based pads functionalized and reinforced with selected samples will be prepared using a chemometric approach, and eventually characterized and validated on food items. The project is expected to have a significant technological, social, and economic impact, as well as to provide a significant step forward in the current state-of-the-art, since it will outline the most effective strategies for the rational exploitation of fruit by-products for the design of sustainable active pads. The interdisciplinary nature of the team, involving three research units with complementary expertise, that is food technology (UNIFG), organic and analytical chemistry (UNINA), and development and physico-chemical characterization of materials (UNIFI), will guarantee the success of the project.

16) prof. Valerio Sebastiano – titolo “Women's Writings and national identity”

This project will study the valuable contribution of women’s writing to the training and strengthening process of the Italian national identity between the Nineteenth and the Twentieth century. This work could contribute to the canon structuring process in women’s writing that is at an advanced stage and it should be verified and integrated; specifically the studies about the Twentieth century are still in fieri. The project is characterized by some peculiarities: a particular attention will be given to female authors belonging to a cosmopolitan milieu, who were born from an international liaison, had foreign origins or were daughters of diplomats (like Fanny Salazar Zampini, Paolina Schiff, Alba de Céspedes, Fabrizia Ramondino). This will guarantee an open-minded point of view and a certain openness to the extra Italian perception of the Risorgimento and post-Risorgimento. This tension to internalization will coexist, conversely, with the exploration of Sicily, an area considered as specimen of the perspective of a peripheral but not marginal region in the context of the Unification. The exploration of a literary corpus, often marginalized and forgotten, and those XIX century works that need a critical examination will lead to the open access publishing of the researchers’ studies of the Universities of Foggia, Pisa and Palermo. The exegetic editions of the unpublished works will be based on archive materials; the editions of the published ones will be based on the editio princeps or on the last edition supervised by the author. Biographical and bibliographical pages will accompany the editions. All materials will converge in the digital archive called “Scrittura delle donne e identità nazionale”. The results will be announced during an international convention, by taking actions in order to enhance the social impact of the experience and with workshops held for students and teachers, readings and exhibitions. The digital Archive could represent an important step into the context of digital humanities and digital philology, in order to emphasize the vitality of Italian studies and encourage the circulation of information between academics and national and international organizations.

Il progetto mira a indagare il prezioso apporto della scrittura delle donne al processo di formazione e consolidamento dell'identità nazionale italiana tra Ottocento e Novecento. Sotto il profilo scientifico, i lavori potranno contribuire al processo di strutturazione del canone della scrittura femminile. Quest'ultimo, grazie alla fioritura degli studi di tale natura in università italiane e straniere (e anche in virtù dell'istituzione di un apposito gruppo di lavoro all'interno dell'AdI, dedicato agli “Studi delle donne nella letteratura italiana”), risulta, per ciò che concerne il Novecento, in fase più avanzata ma necessitante di verifica e integrazione; esso appare, invece, ancora decisamente in fieri se si considerano le scritture femminili del secolo XIX. Il progetto è connotato da alcune peculiarità; sarà riservata particolare attenzione alla produzione di autrici provenienti da un milieu cosmopolita, scrittrici nate da unioni internazionali o di origine straniera o figlie di diplomatici (da Fanny Salazar Zampini a Paolina Schiff, da Alba de Céspedes a Fabrizia Ramondino). Ciò potrà garantire l'assunzione di un punto di vista non provinciale e di un'apertura alla percezione extra-italiana del Risorgimento e dell'epoca postrisorgimentale. Tale tensione all'internazionalizzazione coesisterà, per converso, con l'esplorazione di un'area come la Sicilia, assunta quale specimen della prospettiva di una regione periferica tutt'altro che marginale nella tensione all'unificazione. Condotta dalle UdR impegnate (Foggia, Pisa, Palermo), l'esplorazione di un corpus letterario in molti casi marginalizzato e dimenticato e, per il Novecento, di opere di

autrici più celebri ancora in attesa di approfondimento critico, sarà coronata dalla pubblicazione open access dei testi esaminati e degli studi critici approntati. Le edizioni, di carattere esegetico, saranno fondate su materiali archivistici (per gli inediti) e, per le opere già pubblicate, preferibilmente sull'editio princeps o sull'ultima stampa in vita dell'autrice, se sorvegliata dalla stessa. Le edizioni allestite saranno corredate da schede bio-bibliografiche. I materiali prodotti, edizioni e studi critici, confluiranno nell'istituendo Archivio digitale "Scrittura delle donne e identità nazionale". Gli esiti saranno resi noti attraverso un convegno internazionale e con iniziative atte a potenziare l'impatto sociale dell'esperienza, con organizzazione di seminari per docenti e studenti, reading e mostre. L'Archivio digitale potrà rappresentare un tassello non irrilevante nel contesto delle digital humanities e, in particolare, della digital philology, a ribadire la vitalità degli studi italianistici nel settore e favorire la circolazione d'informazioni tra accademie ed enti nazionali e internazionali.