PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Computer Science for Societal Challenges and Innovation**
Type of scholarship	Scolarship funded by Dipartimento di Scienze Biomediche
Project title	Implementing the DOME recommendations framework for Machine Learning in the Life Sciences
Supervisor	Silvio Tosatto
Supervisor Email	silvio.tosatto@unipd.it
Project description	The DOME project (Walsh et al., Nature Methods 2021) has developed a set of recommendations for reporting supervised machine learning-based analyses applied to biological studies, with the aim of improving machine learning assessment and reproducibility. The project will involve the development of a registry to capture DOME-related information from existing and future literature, along with the definition of metadata describing DOME to be adopted by journals and profiles for quality to help ensure adherence to the recommendations. To facilitate the evaluation of DOME recommendations in scientific articles, a machine learning tool will be developed to automatically assess compliance. Additionally, training materials will be created to explain what DOME is, the registry, and other available tools. Overall, this project aims to promote a more standardised and reproducible approach to machine learning-based analyses.
Mandatory traineeship	n.a.
Company cofinancing	Dipartimento di Scienze Biomediche

PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Computer Science for Societal Challenges and Innovation**
Type of scholarship	Ex DM 117/2023
Project title	Artificial intelligence models for generating music based on the cross-modal interaction between sound and other senses
Supervisor	Antonio Rodà
Supervisor Email	antonio.roda@unipd.it
Project description	The goal of the project is to study and test artificial intelligence models for generating music and sound according to neuroscience principles related to sensory synesthesia and cross-modality of the senses. Therefore, research should address computational models of music composition related to cross-modal interaction between senses and sound, psychoacoustics, and expressiveness in music.
Mandatory traineeship	6
Company cofinancing	SoundFood Srl

PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Computer Science for Societal Challenges and Innovation**
Type of scholarship	Ex DM 117/2023
Project title	Security analysis of Android devices used for payment transactions and fiscal data storage
Supervisor	Eleonora Losiouk
Supervisor Email	eleonora.losiouk@unipd.it
Project description	Payment methods on physical devices have been recently replaced by solutions running on smartphones that use wireless technologies (e.g., Bluetooth, NFC). Despite the benefits, mobile devices, particularly the Android ones, introduce security risks, when used to complete a payment, which have not been addressed by the Android Security community so far. The project focuses on this technology, which enables mobile devices to receive payments in contact/contactless mode, and aims to provide solutions to make it secure through: identification of vulnerabilities and implementation of attacks against Android devices enabled to receive payments via contact/contactless technology; development of defense mechanisms; security analysis of tax data management mechanisms on mobile technology; development of solutions for secure storage of tax data on mobile devices.
Mandatory traineeship	6
Company cofinancing	RCH S.p.A.

PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Computer Science for Societal Challenges and Innovation**
Type of scholarship	Ex DM 117/2023
Project title	Artificial Intelligence for Industrial Ecological Transition
Supervisor	Gian Antonio Susto
Supervisor Email	gianantonio.susto@unipd.it
Project description	Development of Artificial Intelligence approaches for the green revolution and ecological transition in the industrial sector: data-driven technologies (e.g., predictive maintenance, anomaly detection, defect recognition, etc.) will be developed to reduce waste and improve quality and sustainability in the industrial context, such as in semiconductor manufacturing.
Mandatory traineeship	18
Company cofinancing	Statwolf Data Science Srl

PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Computer Science for Societal Challenges and Innovation**
Type of scholarship	Ex DM 117/2023
Project title	Deep Learning for Object Detection and Tracking in Noisy Scenarios
Supervisor	Lamberto Ballan
Supervisor Email	lamberto.ballan@unipd.it
Project description	Object detection and tracking has recently achieved substantial success thanks to the introduction of deep learning models and the availability of large annotated datasets. However, maintaining accuracy in object detection and tracking within noisy scenarios presents a significant challenge. This difficulty arises from a multitude of factors such as poor lighting conditions, image degradation, occlusions, rapid or irregular object movements, and variations in the object's appearance. This challenge is further magnified in medical video analysis due to the inherent intricacies of biological data and the need for precise identification, where inaccuracies could potentially result in misdiagnosis. This PhD project is poised to address these challenges by devising state-of-the-art techniques tailored for object detection, tracking, and re-identification in several high-noise scenarios.
Mandatory traineeship	6
Company cofinancing	Cosmo Intelligent Medical Devices

PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Computer Science for Societal Challenges and Innovation**
Type of scholarship	Ex DM 117/2023
Project title	Cyber Threat Intelligence
Supervisor	Mauro Conti
Supervisor Email	mauro.conti@unipd.it
Project description	Cyber Threat Intelligence (CTI) relates to the activities of collection and distribution of cyber-threats such as Advanced Persistent Threats (APTs), possibly involving automatic techniques such as Natural Language Processing (NLP). The aim of this project is the proposal of novel techniques to improve CTI activities. It will delve into various aspects of cyber threat intelligence, including data collection methods, threat actor profiling, threat detection and analysis techniques, and the use of machine learning for automated threat intelligence.
Mandatory traineeship	6
Company cofinancing	Cy4Gate S.p.A.

PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Computer Science for Societal Challenges and Innovation**
Type of scholarship	Ex DM 117/2023
Project title	Improving SME Business Processes with a focus on Cybersecurity
Supervisor	Mauro Conti
Supervisor Email	mauro.conti@unipd.it
Project description	While companies always strive for optimization of their administrative and industrial processes, security and privacy should not be underestimated. The aim of this project is to propose novel techniques to improve the security of business and industrial processes, particularly for Small and Medium Enterprises, including the ones involving Industrial Control Systems (ICS), while preserving data confidentiality and protecting assets from cyber-attacks.
Mandatory traineeship	6
Company cofinancing	UNINDUSTRIA SERVIZI & FORMAZIONE TREVISO PORDENONE SCARL

PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Computer Science for Societal Challenges and Innovation**
Type of scholarship	Ex DM 117/2023
Project title	Study and design of novel solutions for open source intelligence
Supervisor	Mauro Conti
Supervisor Email	mauro.conti@unipd.it
Project description	Modern investigation tecniques heavily rely on collecting data with automatic tools. The goal of this project is to propose novel techniques and tools to automatize and efficiently retrieve, interact and present data related to a given subject (a person, an organization, a discussion topic, etc), possibly making use of NLP techniques, analysis of data from Internet and Social Media in particular, as well as information inference across different domains.
Mandatory traineeship	6
Company cofinancing	Axerta S.p.A.

PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Computer Science for Societal Challenges and Innovation**
Type of scholarship	Ex DM 117/2023
Project title	Design and evaluation of novel technologies and paradigms for digital trust
Supervisor	Mauro Conti
Supervisor Email	mauro.conti@unipd.it
Project description	The objective of this research project is to design and evaluate cutting-edge technologies and paradigms to enhance digital trust. The project focuses on exploring innovative approaches to address the challenges associated with security, privacy, and trustworthiness in the digital landscape. The project might involve development of advanced authentication mechanisms, secure data sharing frameworks, trust assessment solutions.
Mandatory traineeship	6
Company cofinancing	InfoCert S.p.A. Società Soggetta alla Direzione ed al Coordinamento di Tinexta S.p.A.

PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Computer Science for Societal Challenges and Innovation**
Type of scholarship	Ex DM 117/2023
Project title	AI-powered cybersecurity approaches and solutions
Supervisor	Mauro Conti
Supervisor Email	mauro.conti@unipd.it
Project description	This project aims to explore the application of artificial intelligence (AI) in the field of cybersecurity. The project focuses on developing and evaluating AI-powered approaches and solutions to enhance the effectiveness and efficiency of cybersecurity measures. The aim of this project is to investigate various aspects of AI in cybersecurity, such as application of AI for cybersecurity solutions (e.g., for anomaly detection, behavioral analysis, threat intelligence, and automated incident response), as well as adversarial machine learning issues (e.g., backdoors, and membership inference).
Mandatory traineeship	6
Company cofinancing	Siemens AG

PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Computer Science for Societal Challenges and Innovation**
Type of scholarship	Ex DM 117/2023
Project title	Cybersecurity challenges in the industrial metaverse
Supervisor	Mauro Conti
Supervisor Email	mauro.conti@unipd.it
Project description	The industrial metaverse refers to the integration of virtual and augmented reality technologies within industrial settings, enabling enhanced collaboration, remote operations, and data-driven decision-making. The project seeks to design novel solutions for secure and resilient operation of industrial systems in the metaverse, fostering trust and confidence in this emerging technological landscape.
Mandatory traineeship	6
Company cofinancing	Siemens Corporation Technology

PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Computer Science for Societal Challenges and Innovation**
Type of scholarship	Ex DM 117/2023
Project title	Study of the application of European and international standards on cybersecurity requirements related to electrical and electronic equipment
Supervisor	Mauro Conti
Supervisor Email	mauro.conti@unipd.it
Project description	This research project aims to examine the implementation and impact of European and international standards concerning cybersecurity requirements for electrical and electronic equipment. The goal is to design solutions and tools to efficiently and effectively automatize the compliance to those requirements.
Mandatory traineeship	6
Company cofinancing	DEKRA Testing and Certification S.r.l.

PhD Programme	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(if foreseen)*	**Neuroscience, Technology, and Society**
Type of scholarship	Ex DM 117/2023
Project title	Development and validation of a bioimpedance-based technology for muscle glycogen assessment – GLYCOLAB project
Supervisor	Antonio Paoli
Supervisor Email	antonio.paoli@unipd.it
Project description	Muscle glycogen amount evaluation is a fundamental resource in different health's related fields but especially in sport science. Indeed, in sport science, muscle glycogen evaluation allow to adapt training program and nutrition to athletes' condition. The aim of the project is to create an algorithm able to estimate the amount of muscle glycogen on the basis of data given by an bioimpedance analyzer (resistance and reactance). To elaborate the algorithm we will evaluate the amount of muscle glycogen directly through muscle biopsies and compare to bioimpedance data. We will match direct measurements with resistance and reactance values and possibly with other physiological data to obtain a predictive formula.
Mandatory traineeship	6
Company cofinancing	Akern Srl