Fisica e Astronomia Physics and Astronomy 113R	
Progetto di ricerca **Research project**	**ENG:** "Development of backside-illuminated Silicon Photomultipliers for fundamental physics"
Tipo/Type	Borsa finanziata da enti esterni / Scholarship funded by external organizations
Azienda o ente finanziatore / Funding Body	**Fondazione Bruno Kessler**
Borse/Scholarships	1
Abstract	**ENG:** The candidate will contribute to developing innovative Silicon Photomultipliers (SiPMs) that are Backside Illuminated, through their experimental characterization. Special emphasis will be given to technologies that can improve the SiPM photon detection efficiency in the vacuum ultraviolet (VUV) for applications in fundamental physics at room and cryogenic temperatures. The project includes silicon architecture design, production process development, and application-specific packaging implementations.
Tutor	Tutor Unimib Francesco Terranova Supervisor aziendale Andrea Ficorella, Alberto Gola
Abroad period	Da definire/to be defined
Specific rules	*Intellectual property clauses agreed with the Company apply to this scholarship*

Scienza e Nanotecnologia dei Materiali Materials Science and Nanotechnology 116R	
Progetto di ricerca **Research project**	**ITA:** "Rilascio di CO2 fotoindotto in materiali porosi" **ENG:** "Photo-induced CO2 desorption in porous materials"
Tipo/Type	Borsa finanziata da enti esterni / Scholarship funded by external organizations
Azienda o ente finanziatore / Funding Body	**Nuovo Pignone S.r.l.**
Borse/Scholarships	1
Abstract	**ITA:** Gli adsorbenti solidi porosi rappresentano alternative promettenti per la cattura della CO_2. Gli attuali sistemi basati sull'adsorbimento si basano su variazioni di pressione o temperatura, ma questi approcci consumano molta energia. Pertanto, lo sviluppo di metodi a basso consumo energetico per regolare la capacità di adsorbimento è altamente auspicabile. La ricerca si concentrerà sullo sviluppo, la caratterizzazione e l'ottimizzazione di molecole fotoattive incorporate in materiali nanoporosi e/o mesoporosi per la cattura della CO_2 e il desorbimento indotto dalla luce. Verranno studiate diverse strutture porose per sviluppare una tecnologia di desorbimento della CO_2 efficiente dal punto di vista energetico, che possa essere integrata in sistemi di cattura diretta dall'aria o in processi industriali di cattura del carbonio. **ENG:** Porous solid adsorbents are promising alternatives for CO2 capture. The current adsorption-based systems rely on pressure or temperature swings, but these approaches consume substantial energy. The development of lower-energy methods to regulate adsorbent capacity is highly desirable. The research will focus on the development, characterization, and optimization of photo-active molecules embedded in nanoporous and/or mesoporous materials for CO2 capture and light-induced desorption. Various porous frameworks will be investigated to establish an energy-efficient CO2 desorption technology that could be integrated into direct air capture systems or industrial carbon capture processes.
Tutor	Tutor UNIMIB: Prof. Silvia Bracco Tutor Nuovo Pignone S.r.l.: Prof. Elkid Cobani
Abroad period	Da definire/To be defined
Specific rules	*Intellectual property clauses agreed with the Company apply to this scholarship*

Scienze Chimiche, Geologiche ed Ambientali **Chemical, Geological and Enviromental Sciences** **Scienze Chimiche** **Chdemical Sciences** **124R**	
Progetto di ricerca **Research project**	**ITA:** "Reazioni elettrochimiche nelle tecnologie dell'idrogeno attraverso nuovi elettrocatalizzatori e le loro interazioni con l'elettrolita" **ENG:** "Electrochemical reactions within hydrogen technologies through novel electrocatalysts and their interactions with the electrolyte "
Tipo/Type	Borsa finanziata dal Dipartimento/Department scholarship
Funding Body	
Borse/Scholarships	1
Abstract	**ITA:** Il candidato sintetizzerà elettrocatalizzatori privi di metalli del gruppo del platino (PGM) per una varietà di reazioni delle tecnologie relative alla produzione e conversione dell'idrogeno a bassa temperatura. Questi elettrocatalizzatori saranno sintetizzati attraverso metodi verdi e scalabili e includeranno i primi metalli di transizione grezzi. I processi di sintesi coinvolgeranno, in generale, pirolisi (a temperatura e atmosfera controllate), metodi sol-gel e processi di sintesi idrotermale. La chimica superficiale e la morfologia dei nuovi materiali saranno sottoposte a una caratterizzazione dettagliata. Gli elettrocatalizzatori sintetizzati saranno sottoposti a screening elettrochimico preliminare mediante elettrodo a disco rotante (RDE). La loro interazione con gli elettroliti a diversi pH e contenenti diverse tipologie di cationi e anioni sarà studiata a fondo. Infine, questi nuovi elettrocatalizzatori saranno depositati e integrati su uno strato di trasporto poroso e testati elettrochimicamente in semicella. Si incoraggiano i candidati con esperienza in scienza dei materiali e/o chimica fisica e/o elettrochimica a candidarsi. **ENG:** The candidate will synthesize electrocatalysts free of platinum group metals (PGMs) for a variety of reactions of the technologies related to hydrogen production and conversion at low temperature. These electrocatalysts will be synthesized through green and scalable methods and will include the first raw transition metals. The synthesis processes will involve in general, pyrolysis (controlled temperature and atmosphere), sol-gels methods and hydrothermal synthetic processes. Surface chemistry and morphology of the novel materials will undergo detailed characterization. The electrocatalysts synthesized will undergo preliminary electrochemical screening by means of rotating disk electrode (RDE). Their interaction with the electrolytes at different pHs and containing different type of cations and anions will be thoroughly investigated. Eventually, these novel electrocatalysts will be deposited and integrated over a porous transport layer and tested electrochemically in half cell. Candidates with background in materials science and/or physical chemistry and/or electrochemistry are encouraged to apply.
Tutor	Tutor UNIMIB: Prof. Carlo Santoro
Abroad period	Da definire/To be defined
Specific rules	*No specific rules*

Scienze Chimiche, Geologiche ed Ambientali **Chemical, Geological and Enviromental Sciences** **Scienze Ambientali** **Enviromental Sciences** **124R**	
Progetto di ricerca **Research project**	**ENG:** "Advancing Air Quality Monitoring through Citizen Science and Low-Cost Portable Sensors"
Tipo/Type	Borsa finanziata da enti esterni / Scholarship funded by external organizations
Azienda o ente finanziatore / Funding Body	**ROAD (ROme Advanced District)**
Borse/Scholarships	1
Abstract	Air pollution is a critical environmental and public health challenge globally, especially in urban settings. Traditional air quality monitoring systems, while very accurate, are typically expensive, sparse, and limited in spatial coverage. This research aims to explore and develop a novel framework for air quality monitoring based on citizen science through the deployment of low-cost, portable devices, addressing key pollutants of concern such as PM2.5 and PM10. These innovative devices can be employed in both outdoor and indoor settings, thus potentially offering a novel perspective on air quality by enabling the integration of data collected along typical "urban days" made of both outdoor mobility and indoor activities. Focus areas might include: (1) technical assessment and optimization of previously developed low-cost air quality monitoring devices; (2) development of scalable citizen science methodologies for data collection; (3) design and management of monitoring campaigns; (4) data analysis in comparison with other data sources (e.g. institutional monitoring networks) and in relation to other datasets of interest (e.g. citizen lifestyles/mobility patterns and/or respiratory diseases). By empowering communities to actively participate in data collection and environmental stewardship, this approach has the potential to complement institutional monitoring networks, democratize access to environmental data, raise public awareness and foster more sustainable and conscious lifestyle choices.
Tutor	Supervisor UNIMIB: Maurizio Gualtieri; co-supervisor: Luca Ferrero Supervisor aziendale: Edoardo Dellarole
Abroad period	Da definire/To be defined
Specific rules	*Intellectual property clauses agreed with the Company apply to this scholarship*