



Rosario Calogero

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Expert in marine microbial ecology and biotechnology with particular reference to polluted marine environments

● WORK EXPERIENCE

16/01/2020 – CURRENT Messina, Italy

RESEARCH FELLOW AT STAZIONE ZOOLOGICA ANTON DOHRN (ATTACHMENT 1-2) STAZIONE ZOOLOGICA "ANTON DOHRN"

During the OR1 - Marine hazard project

- Sampling and sample processing
- Microbial community analysis (hydrocarbon degrading bacteria)
- Protein extraction from Gram-positive and Gram-negative bacteria from different methods
- Cultivation and isolation of Bioluminescent bacteria from Deep marine organisms
- Cultivation and isolation of pathogen microorganisms from water and sediment using specific media
- Extraction of hydrocarbons and heavy metals from water and sediment
- Isolation in pure culture on mineral medium and specific growth substrates.
- Screening of isolates for the detection of Alk and Biph genes
- Data and statistical analysis
- Contribution for writing a scientific article

During the CRIMAC project:

- Sorting activities from sediment samples
- Sediment chemical analyses
- Research of pathogenic bacteria from water and sediments

Department Dip. EMI (Messina) | **Address** C.da Porticello, Villa Pace 98167 – Messina, Messina, Italy

11/10/2021 – 17/11/2021

COORDINATOR OF OCEANOGRAPHIC TEAM (ATTACHMENT 3) MAINPORT-GEO

Survey offshore Sicily

Coordination of oceanographic team, CTD data collection and processing. Collection processing and preserving of Deep-Sea biological samples.

01/09/2013 – 01/01/2014

CO.CO:PRO PROJECT FIRB 2008 COD: RBF08AWP6_002 (ATTACHMENT 4) IAMC-CNR

- community analysis associated with deep marine environments
- CARD-FISH technical implementation and development of a specific protocol for water and sediment samples of hypersalinated anoxic ampoules
- in-depth study of the most important metabolic pathways of deep environments
- Metagenomic expression library and fosmidic library
- Genomic analyses

15/09/2012 – 15/02/2013

CO.CO.PRO PROJECT FIRB 2008 COD: RBF08AWP6_002. (ATTACHMENT 5) IAMC-CNR

- preparation of metagenomic libraries
- phylogenetic affiliation of prokaryotic communities
- monitoring of the expression of key enzymes involved in the Deep-sea ecosystem
- statistical data analysis
- Using software (MEGA 5 and Genius)

08/11/2012 – 19/11/2012

MEMBER OF RESEARCH UNIT (ATTACHMENT 6) URANIA VESSEL

EUROFLEETS 2 Oceanographic cruise (central Mediterranean Sea):

- water and sediment sampling for microbial community analyses
- water and sediment sampling for hydrocarbon enrichment culters

08/05/2012 Messina

MEMBER OF RESEARCH UNIT (ATTACHMENT 7) IAMC-CNR

Sampling activities at Meromictic Lake Lago Faro Messina of:

- Water and sediment sampling for biochemical analyses (different Cycle of CO₂ fixation);
- Water and sediment microbial community analyses;
- *Diazona violacea* for biotechnological application;
- Gas for detection H₂S and CH₄

27/06/2011 – 30/06/2011

MEMBER OF RESEARCH UNIT (ATTACHMENT 8) ASTREA VESSEL

During PANA 11 -Oceanographic cruise (Aeolian Island) sampling of:

- Water and sediment for gas analyses;
- Water and sediment for hydrocarbon enrichment cultures;
- Water and sediment for microbial community analyses.

05/05/2011 – 07/05/2011 Augusta (SR)

MEMBER OF RESEARCH UNIT (ATTACHMENT 9) IAMC-CNR

During sampling activities on board "Motobarca Angela":

Water and sediment sampling activities after hydrocarbon chronic pollution to study:

- microbial communities associated to water and sediment;
- Gas sampling and analyses (CO₂, H₂S; CH₄);
- Hydrocarbon extraction.

16/09/2021 – 27/09/2021 Golfo di Patti (ME)

MEMBER OF RESEARCH UNIT (ATTACHMENT 10) STAZIONE ZOOLOGICA "ANTON DOHRN"

Sampling activities as part of the "REsPoNSo" 65 / RBC / 18 project. Measure 1.40 "Protection and restoration of biodiversity and marine ecosystems and compensation schemes in the context of sustainable fisheries" of the European Maritime and Fisheries Fund (EMFF) 2014-2020.

During sampling activities on board "motobarca Papà Carmelo":

- Sampling of marine litter;
- Sampling benthic and nektonic fish fauna following a trawling campaign.

01/06/2021 – 01/03/2022 Messina

COLLABORATOR OF RESEARCH UNIT (ATTACHMENT 11) STAZIONE ZOOLOGICA "ANTON DOHRN"

During scientific research in "Ecology and biology of mesopelagic, bathypelagic and rare deep-sea fish":

- Collection of beached samples of bathyphilic species in the Strait of Messina;
- processing of such samples in the laboratory;
- bacterial cultivation and isolation through specific soils,
- taxonomic identification through 16S rDNA and search for the Lux AB gene.

01/01/2022 – CURRENT Amendolara

RESEARCH PROJECT COLLABORATOR (ATTACHMENT 12) STAZIONE ZOOLOGICA "ANTON DOHRN" SEDE AMENDOLARA (CALABRIA)

- Water analysis activities through specific colimetric indexes;
- Preparation of culture media,
- Count of Colony Forming Units
- preparation of sampling methodologies for chemical analyzes

18/09/2023 – 21/09/2023 MESSINA, Italy

SUPPORT STAFF FOR PRACTICAL EXERCISES (ATTACHMENT 13) INTERNATIONAL SUMMER SCHOOL ON THE STUDY OF EXTREME ENVIRONMENTS THROUGH INTEGRATED APPROACHES

Practical tools for the exploration of microbial communities in extreme environments: biodiversity and biotechnology,

● **EDUCATION AND TRAINING**

27/01/2024 – CURRENT Italy

BASIC OFFSHORE SAFETY INDUCTION AND EMERGENCY TRAINING (BOSIET) WITH EMERGENCY BREATHING SYSTEM (EBS) OPITO - APT Safety group

12/12/2022 – 18/12/2022

PARTECIPANT Association for Cephalopod Research 'CephRes' a non-profit organization founded in 2011

01/01/2014 – 17/01/2017 Messina, Italy

PHD (ATTACHMENT 14) University of Messina.

- In situ identification of metabolic pathways through analysis of intermediate metabolites
- application of biostimulation treatment
- Creation of a mesoscale pilot system (mesocosms) in order to reproduce the environmental conditions to have a replicability of the experimentation and to be able to control the key parameters for the degradation of the hydrocarbons themselves.
- Handling of biological samples
- Culture medium (liquid and solid) preparation
- Microorganism cultivation and harvesting techniques of bacteria
- DNA extraction and genetic analysis, PCR, Real Time PCR and electrophoresis analysis of amplicons;
- Use of different software for analysis of nucleotide sequence
- Chemical analysis after extracting the hydrocarbons using the 3550C EPA (US Environmental Protection Agency) procedure, the Master GC DANI Instruments (Development Analytical Instruments) gas chromatograph with FID detector was used
- Data analysis and statistical analysis

Website www.unime.it |

Thesis Study on the diversity and function of bacterial communities associated with marine sediments contaminated by hydrocarbons and identification of the main metabolic pathways related to the degradation of the pollutant

27/10/2011 Messina, Italy

MASTER OF SCIENCE IN MARINE BIOLOGY AND ECOLOGY OF THE COASTAL MARINE ENVIRONMENT (ATTACHMENT 15) University of Messina, Messina (Italy)

-Creation of the hydraulic scheme, conceptual model and experimental design.

Study of the qualitative - quantitative dynamics of the microbial population present in anoxic marine sediments contaminated by hydrocarbons through the following methods:

- qualitative analysis of the SSCP molecular technique to identify variations in the sequence of a single nucleotide; this is based on the different mobility on gel-electrophoresis of single-stranded DNA following conformation changes.
- quantitative analysis of DAPI and CARD-FISH methods count and use of the epifluorescence microscope.

Furthermore, the parameters that influence the biodegradation processes in marine sediments were investigated and quantified through:

- Use of the gas chromatograph,
- Quantitative analysis of nutrients
- BOD (biochemical oxygen demand), i.e. the indirect measurement of the biodegradable organic matter content in a water sample or aqueous solution, the latter is considered one of the most commonly used parameters to estimate the polluting load of water.

Website www.unime.it Field of study Natural sciences, mathematics and statistics

Final grade 110/110 e lode accademica

Thesis Development of in-situ systems for the recovery of anoxic marine sediments contaminated by hydrocarbons

03/2010 – 27/10/2011 Messina, Italy

GRADUATED IN MARINE BIOLOGY AND ECOLOGY (ATTACHMENT 16) University of Messina, Messina (Italy)

- Liquid and solid cultures of marine bacteria for the production of polyunsaturated fatty acids:
- Phenotypic characterization
- morphological tests
- biochemical tests
- phylogenetic analysis
- ARDRA
- Introduction to aquaculture
- Rotifer cultures (*brachiouneus plicatilis*)
- Using an inverted microscope
- Utermol method
- Statistical data analysis

Website www.unime.it | **Final grade** 105/110 |

Thesis Use of marine bacteria producing polyunsaturated fatty acids (PUFA) as an alternative food for rotifer crops

15/06/2015 – 17/06/2015

ANTI--POLLUTION EXERCISE Marina Militare "Aretusa 2015" Syracuse, Sicily, Italy.

"In situ" oil clean--up techniques and practice during BRAAVO project(Ocean 2013.1), simulation for hydrocarbons containment:

- containment breakdowns
- biodispersants
- suction tubes

08/08/2011 – 13/08/2011 Messina

STAGE (ATTACHMENT 17) Charybdis Vaccines (spin-off of the university of Messina)

Preparation and maintenance of cell cultures

Antibiotic-resistance screening against marine pathogens and heterotrophic bacteria.

07/02/2011 – 11/02/2011 Priolo Gargallo (SR), Italy

TRAINING ACTIVITIES ON ANALYTICAL METHODS (ATTACHMENT 18) Syndial,ENI environmental laboratory

Under supervision of Dott. Alfonso Modica (supervisor environmental laboratory) training activities:

- Water and sediment treatment according to EPA 3510C 1996, EPA 5021A 2003 and EPA 3550C 2000,methods for extraction;
- Research of hydrocarbons in water and sediment with GC (EPA 8015D 2003 methods)
- Data elaboration with THERMO software

07/06/2011 – 10/06/2011

PARTICIPATING MEMBER SITE MICRO COURSE – FROM CULTIVATION TO NEW--GENERATION MOLECULAR METHODS.(ATTACHMENT 19) SitE Micro

- Learning cell cultivation techniques
- Molecular biology techniques learning

Address Villa Pace, sant'agata Messina, Sicily, Italy.

18/03/2011 – 19/04/2011

SCIENTIFIC GUIDE (ATTACHMENT 20) National Antarctic Museum

Scientific guide for middle and high schools with the aim of:

- raise common opinion on glacial landscapes
- understand the importance of an open-air laboratory
- grasp the importance of scientific research
- studying climate change and the ozone hole

● PUBLICATIONS

2024

PCB bioremediation potential of thermophilic strains from shallow hydrothermal vent (Vulcano Island)

R. Calogero, E. Arcadi, F. Fabiano, C. Rizzo, T. Romeo, S. Greco

Journal of Water Process Engineering 61, 105330

2024

Deciphering the evolvement of microbial communities from hydrothermal vent sediments in a global change perspective

Carmen Rizzo, Erika Arcadi, Rosario Calogero, Alessandro Ciro Rappazzo, Gabriella Caruso, Giovanna Maimone, Angelina Lo Giudice, Teresa Romeo, Franco Andaloro

Environmental Research Volume 240 Pagine 117514

2023

Integrated approach for marine litter pollution assessment in the southern Tyrrhenian Sea: Information from bottom-trawl fishing and plastic ingestion in deep-sea fish

Valentina Scutteri, Cristina Pedà, Francesco Longo, Rosario Calogero, Giuseppe Cangemi, Luca Pagano, Pietro Battaglia, Matteo Nannini, Teresa Romeo, Pierpaolo Consoli

Marine Pollution Bulletin Volume 188 Pagine 114 - 661

2023

Novel insights on the Bacterial and Archaeal diversity of the Panarea shallow-Water Hydrothermal vent field

Erika Arcadi, Emanuela Buschi, Eugenio Rastelli, Michael Tangherlini, Pasquale De Luca, Valentina Esposito, Rosario Calogero, Franco Andaloro, Teresa Romeo, Roberto Danovaro

Microorganisms Volume 11 Numero 10 Pagine 2464

2023

Microbial communities inhabiting shallow hydrothermal vents as sentinels of acidification processes

Erika Arcadi, Carmen Rizzo, **Rosario Calogero**, Valentina Scutteri, Francesco Fabiano, Pierpaolo Consoli, Franco Andaloro, Teresa Romeo

Frontiers in Microbiology, vol.14

2023

How Rare Are Argonautoidea Octopuses in the Mediterranean? New Data from Stranding Events, Stomach Contents and Genetics

Pietro Battaglia, Cristina Pedà, Carmen Rizzo, Maria Giulia Stipa, Erika Arcadi, Francesco Longo, Giovanni Ammendolia, Mauro Cavallaro, Ignazio Rao, Alberto Villari, **Rosario Calogero**, Pierpaolo Consoli, Mauro Sinopoli, Franco Andaloro, Teresa Romeo

Biology Volume 12 Numero 3 Pagine 420

2022

Metal-tolerant bacteria for monitoring Mediterranean Shallow Hydrothermal environments: the case studies of Panarea

Isolation and identification of luminescent bacteria in Deep Sea marine organisms from Sicilian waters (Mediterranean sea). Calogero R., Rizzo C., Arcadi E., Stipa Mg., Consoli P., Romeo R. and Battaglia P. Journal of Marine Science and Engineering, 10 (8) 1113.

Ecological and biotechnological relevance of Mediterranean hydrothermal vent systems. Rizzo C*, Arcadi E*, **Calogero R**, Scutтери V, Consoli P, Esposito V, Canese S, Andaloro F and Romeo Minerals MDPI <https://doi.org/10.3390/2021>;

The culturable mycobiota of a Mediterranean marine site after an oil spill: isolation, identification and potential application in bioremediation. Bovio E, Gnavi G, Prigione V, Spina F, Denaro R, Yakimov MM, **Calogero R**, Crisafi F, Varese GC Science of the Total Environment <https://doi.org/10.1016/j.scitotenv.2016.10.064> 2017;

Bioremediation of oil polluted marine sediments: A bio-engineering treatment. Cappello, S. **Calogero, R.**, Santisi, S., Genovese, M., Denaro, R., Genovese, L., Giuliano, L., Mancini G, Yakimov, M.M. International Microbiology 18:127-134 2015;

Effective bioremediation strategy for rapid in situ cleanup of anoxic marine sediments in mesocosm oil spill simulation. Genovese, M. Crisafi, F., Denaro, R., Cappello, S., Russo, D., **Calogero, R.**, Santisi, S., Catalfamo M, Modica A, Smedile F, Genovese L, Golyshin PN, Giuliano L, Yakimov, M.M. Frontiers in Microbiology <https://doi.org/10.3389/fmicb.2014>;

Effect of Bioemulsificant Exopolysaccharide (EPS2003) on microbial community dynamics during assays of oil spill bioremediation: a microcosm study. Cappello, S. Genovese, M., Della Torre, C., Crisafi, A., Hassanshahian, M., Santisi, S., **Calogero, R.**, Yakimov, M.M. Marine Pollution Bulletin Volume 64, Issue 12, December 2012, Pages 2820-2828. 2012;

Characterisation of oil degrading bacteria isolated from bilge water. Cappello, S., Santisi, S., **Calogero, R.** Hassanshahian, Yakimov, M.M. Water, Air, & Soil Pollution volume 223, pages 3219–3226 2012; **Presence of hydrocarbon degrading bacteria in gills of mussel *Mytilus galloprovincialis* in polluted environment: a mesoscale simulation study.** Cappello, S., Russo, D., Santisi, S., **Calogero, R.**, Gertler, C., Crisafi, F., De Domenico, M., Yakimov, M.M. Chemistry & Ecology. <https://doi.org/10.1080/02757540.2011.639768> 2012.

● **JOB-RELATED SKILLS**

- Use of fundamental microbiological and molecular biological techniques;
- Study for the execution of classic and innovative techniques for the characterization and remediation of in situ and ex situ sediments;
- Sediment sorting activities;
- Integrated chemical-biological-ecotoxicological assessment of the quality of the sediments and estimate of the risk connected to the presence of contaminated sediments;
- Ecotoxicological tests on solid matrix (enzyme induction test with *Vibrio fischeri*-Microtox®, acute and/or chronic toxicity test with *Corophium orientalis*, bioaccumulation test with *Hediste diversicolor*);
- Extraction of DNA / RNA from water column, sediments, soil, cell cultures, animal tissues.
- Isolation and physiological characterization of marine bacteria;
- Cultivation, characterization, isolation and physiology of marine microorganisms in conditions of microaerophilia and anoxia, in different culture media;
- Selection of microorganisms through the use of antibiotics;
- Taxonomic identification of bacteria through the analysis of the 16S rDNA;
- Analysis of mixed microbial communities, construction of clone libraries;
- Quick diagnosis of bacterial infections through the use of molecular markers;
- Monitoring of contaminated marine areas through the use of molecular marker
- Use of bacterial species and / or enzymes for monitoring pollution in the marine environment;
- Monitoring of the expression of functional genes in natural samples through Real Time PCR;
- Quantization of bacterial cells in natural samples and in fish tissues through -- -- DAPI, FISH and CARD--FISH ;;
- Use of image acquisition systems;
- Use of laboratory instruments: thermal cycler, electrophoretic cell, autoclave, image acquisition, laminar flow hood, UV ray hood, chemical hood, anaerobic hood, NanoDrop, Luminometer, Fluorimeter, refractometer, pH meter, redox probe, spectrophotometer, gas chromatograph, filtration ramps, peristaltic pump, microscope optical transmission and fluorescence, stereoscope, analytical and microanalytical scales, ichthiometer.
- Use of sampling equipment for water, sediment: Niskin (Rosette), CTD probe, box corer, corer.

1. **Hydrocarbon and PCB degrading bacteria in shallow hydrothermal vents (Levante Bay) and biotechnological potential in bioremediation field.** International Congress of Extremophiles, 19 dicembre 2023. **Calogero R.**, Rizzo C., Arcadi E., Fabiano F., Romeo T. Greco S.
2. **Microbial assemblage associated to demersal fish species inhabiting the shallow hydrothermal site of Vulcano Island, Mediterranean Sea.** 2nd EvolMar virtual Congress, 14-17 novembre 2023. Arcadi E., Rizzo C., Battaglia P., Stipa MG., **Calogero R.**, Consoli P., Pagano L., Sciutteri V., Andaloro F., Romeo T.
3. **Luminescent Bacteria associated with rare deep-sea species from sicilian waters (Mediterranean Sea).** XXXII Congresso della Società Italiana di Ecologia, Catania 6-8 settembre 2023. Dias V., Rizzo C., **Calogero R.**, Papetti C., Battaglia P., Romeo T.
4. **Diversity of prokaryotic communities associated with benthic invertebrates inhabiting the hydrothermal area located in the Gulf of Patti, Tyrrhenian Sea.** Società Italiana di Ecologia (SiTE) Congress, Catania 6-8 settembre 2023. Fabiano F., Rizzo C., Arcadi E., **Calogero R.**, Aricò C and Romeo T.
5. **Microbial colonization in mussel farming socks made of Mater-Bi an innovative bio-based material.** 32° European Society for Comparative Physiology and Biochemistry (ESCPB) 2022- ORAL PRESENTATION. **Calogero R.**, Arcadi E., Giommi C., Scozzafava S., Laface F., Greco S., Romeo T. and Rizzo C.
6. **Panarea shallow-water hydrothermal vents as natural accelerator of antibiotic resistance and new insights of their microbial diversity.** AIOL,incontro giovani ricercatori 2022 Microsoft teams. Arcadi E., Rastelli E., Tangherlini M., **Calogero R.**, Andaloro F. and Teresa Romeo
7. **Optimization and enhancement of recovery of anoxic polluted marine sediments.** XII FISV 2012 Roma,Italia. Cappello **Calogero R.**, S.,Santisi S., Denaro R., Genovese, M., Catalfamo M., Mancini G., Crisafi F., Russo D. e YakimovM.M.
8. **Studio ecotossicologico dell'impatto dei processi di bioremediation in ambienti marini contaminati da petrolio.**XX AIOL 2011. Lecce, Italia.Russo D., **Calogero R.**, Longo S., Santisi S., Ruggeri G., Yakimov M.M.,
9. **Studio eco-tossicologico degli effetti degli idrocarburi policiclici aromatici (IPA) sulla catena trofica marina.** XX AIOL 2011 Longo S., **Calogero R.**, Santisi S., Ruggeri G., Yakimov M.M., Cappello S.
10. **Isolamento e caratterizzazione di nuovi batteri idrocarburoclastici.** 42° SIBM 2011. Olbia,Italia Santisi S., **Calogero R.**, Denaro R., Genovese M., Ruggeri G., Leonardi M., Yakimov M.M., Cappello S.
11. **Assays of Bioaugmentation for recovery of oil-Polluted Sea-water:a mesocosm Experiment.** XXI Congresso della società italiana di Ecologia 2011. Palermo,Italia Cappello S., Santisi S., **Calogero R.**, Russo D., Emtiazi G., Hassanshahian M., and Yakimov M.M.
12. **Optimization of biostimulation method for recovery of oil-polluted marine sediments.** XXI Congresso della società italiana di Ecologia 2011. Palermo,Italia Cappello S., **Calogero R.**, Santisi S., Longo S., Marra A., and Yakimov M.M.

● **PARTECIPATION IN RESEARCH PROJECT**

2013 – 2016

Member of Research Unit of IAMC-CNR for the European Project FP7-KEEB-2012.3.5-01 "Innovative biotechnologies for tackily oil spill disasters (KILL-SPILL);

2013-2016

2011 – 2014

Member of Research Unit of IAMC-CNR for the European Project FP7-KBBE.2010.3.5-03 "Unravelling and exploiting Mediterranean Sea microbial diversity and ecology for xenobiotics' and pollutants' clean up" (ULIXES);

2011-2014

Member of Research Unit of IAMC-CNR for the European Project FP7-KBBE-2009-3-5-01 "Molecular Approaches and Metagenomic Investigations for optimizing clean-up of PAH contaminated sites" (MAGICPAH);

2010-2015

23/05/2016

Organizing Member of research of the workshop INNOVATIVE TOOLS FOR MONITORING THE MARINE ENVIRONMENT: BRAAVO PROJECT ACHIEVMENTS" of the BRAAVO project (Ocean 2013. 1 -- GA n ° 614010),

01/11/2022 – 31/10/2023

Member of Research Unit CONSERVAZIONE SZN PO FEAMP 2014/2020: VALORIZZAZIONE DELL'ALLEVAMENTO DELLE SPECIE ENDEMICHE E VALORIZZAZIONE DELLA MOLLUSCHICOLTURA NEL MESSINESE

● **SCIENTIFIC PRODUCTIVITY**

Scientific productivity

No. of publications with IF: 15 H--Index: 7
Total Citations Number: 355 Source: Scholar Citation (Dec2023)
PhD achievement year: 2017
Year First ISI publication: 2012

● **PATENTS**

17/06/2009

– PSS Open Water Diver patent issued by Oloturia Sub (Attachment 21)

23/04/2022 – 22/04/2024

Automated External Defibrillation (Attachment 21)

Released by DAN Europe
Trained by Bruno Iacono

23/04/2022 – 22/04/2024

Basic Life Support Provider (Attachment 22)

Released by DAN Europe
Trained by Bruno Iacono

23/04/2022 – 23/04/2024

Oxygen First Aid Provider (Attachment 23)

Released by DAN Europe
Trained by Bruno Iacono