

Curriculum Vitae
Scientific Research and
Professional Activities
Prof. Dr. Nicola Frison

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Nicola Frison: Curriculum Vitae

1 Personal Details

Prof. Dr. Nicola Frison

Born in Montagnana (Italy), February 21st, 1985

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2 Education

-PhD in Environmental Science, University Ca' Foscari of Venice, 2015. Final dissertation: **“Novel biological sustainable solutions to optimize bioresource recovery and energy efficiency from downstream of anaerobic treatments”**.

-Interuniversity Master of Engineering (2° Level, post-lauream), “Chemical Engineering for Environment” from the University of Verona, Venice, Padova, Udine, Trieste and Bologna. Final dissertation: **“Nitrogen removal from anaerobic digestate through the via-nitrite pathway in Sequencing Batch Reactor”**, 2011

-M.sc, Environmental Science, University Ca' Foscari of Venice, final grade 110/110. Final dissertation: **“Energy recovery from organic waste in the agro-industrial sector: case studies in Veneto Region”**, 2010.

-B.sc, Land use and Planning, University of Padua, final grade 106/110. Final dissertation: **“Hydrological Monitoring of a small alpine basin”**, 2007.

3 Attendances at specializing courses

Nicola Frison attended the 3rd Summerschool (2nd edition) “Innovative technologies for urban wastewater treatment plants: Short, intensive and highly specialised course focussed on innovative technologies emerging nowadays for the treatment of municipal wastewaters” on behalf of NOVEDAR_Consolider (CSD2007-00055), Santiago de Compostela (Spain), from 28th June to 4th June 2012.

Nicola Frison attended the 1st Training School Water 2020 “Energy recovery in anaerobic processes in wastewater and sludge processing” on behalf of Cost Action ES1202, Gliwice (PL), from 23rd to 28th of September 2013.

4 Professional Appointments

From May 2022 to date, Nicola Frison is associate professor (SSD ING-IND/25) at the Department of Biotechnology. Within the research activities, Nicola Frison established a research team focusing mainly on the recovery of bio-based compound from organic waste and wastewater, extraction of volatile fatty acids, microbial protein production and biological conversion of CO₂.

From March 2019 to May 2022, Nicola Frison was assistant professor RTD type B (SSD ING-IND/25) at the Department of Biotechnology. Within the research activities, Nicola Frison worked on development of biological process and biorefineries from organic waste and wastewater for the recovery of high added value bio-based products.

From March 2017 to May 2019, Nicola Frison was assistant professor (RTD type A, SSD ING-IND/25) at the Department of Biotechnology, dealing with the integration of innovative biological systems in existing wastewater treatment plant for the valorisation of municipal wastewater and sewage sludge, recovery of phosphorus and biopolymers (polyhydroxyalkanoates).

October 2016 to May 2019, Nicola Frison was post-doc at the University of Verona financed by the Smart-Plant project (European Commission H2020), dealing on the design of the innovative biological pilot system for the production of polyhydroxyalkanoates and struvite recovery from municipal wastewater.

October 2015, Nicola Frison was post-doc researcher at the University of Verona financed by the ENERWATER project (European Commission H2020), dealing on the energy optimization of the biological nutrients removal processes for the wastewater treatment.

Position as post-doc researcher at the University of Verona financed by the LIFEWASTE project (LIFE 12 ENV/CY/000544), dealing on the design, supervision and optimization of a Sequencing Batch Reactor for the biological nutrients removal from zootechnical anaerobic digestate in Cyprus Island, 2014

Position as post-doc researcher at the University of Verona: the research line focused on the interaction between the anaerobic digestion of fermentable biowaste and the side stream biological nutrients removal (Financed project: VALORGAS – Valorisation of food waste to biogas, FP7 n. 241334), 2011.

5 Institutional responsibility

2017 to present: Member of the Department of Biotechnology Council.

2019-2020-2021: Participations as secretary of the Departmental Board of Biotechnology.

2019. Member of the committee for the establishment of a new Master's Degree Program (LM69) in "Sustainable Management of grape and wine identity."

2021 to date: Member of the Third Mission Committee of the Department of Biotechnology.

2021 to date: Member of the review committee for the Bachelor of Science in Biotechnology (L2) degree program.

2021 to date: Member of the Quality Assurance Group of the L2 degree program.

2022 to date: Member of the technical committee for the development of the sustainability reports of the University of Verona

6 Teaching activity

Nicola Frison has been or holds the following courses at the University of Verona:

Academic year	Degree course	Teaching	CFU
2016/2017	Agri-food Biotechnology (LM7)	Bio-processing of agro-food waste	6
2017/2018	Biotechnology (L2)	Fundamentals of environmental biotechnology processes and plants with laboratory	5+1
2018/2019	Biotechnology (L2)	Fundamentals of environmental biotechnology processes and plants with laboratory	5+1
2019/2020	Biotechnology for bioresources and sustainable development (LM8)	Biological treatment of wastewater	6
2019/2020	Biotechnology (L2)	Fundamentals of environmental biotechnology processes and plants with laboratory	5+1
2019/2020	Biotechnology (L2)	Fundamentals of biotechnological processes and plants laboratory	1
2020/2021	Biotechnology for bioresources and sustainable development (LM8)	Biological treatment of wastewater	6
2020/2021	Biotechnology (L2)	Fundamentals of environmental biotechnology processes and plants with laboratory	5+1
2020/2021	Biotechnology (L2)	Fundamentals of biotechnological processes and plants laboratory	1
2021/2022	Biotechnology for bioresources and sustainable development (LM8)	Biological treatment of wastewater	6
2021/2022	Biotechnology (L2)	Bioreactors with laboratory	5+1
2022/2023	Biotechnology for bioresources and sustainable development (LM8)	Biological treatment of wastewater with practices	5+1
2022/2023	Biotechnology (L2)	Bioreactors with laboratory	5+1

Thesis advisor for bachelor's degree (L2):

Andrea Gualtieri. Titolo: Caratterizzazione e metodi di estrazione di acidi grassi volatili prodotti dalla fermentazione acidogenica di reflui di industria dolciaria (aa 2019/2020).
Fabio Gugolati. Titolo: Monitoraggio di un impianto di digestione anaerobica con produzione di biogas alimentato con biomasse di origine agricola (aa (2019/2020).

Gianmarco Remelli. Titolo: Valorizzazione dei rifiuti organici: Recupero componenti ad alto valore, produzione di acidi grassi e biogas (aa 2019/2020).

Davide Bertasini. Titolo: Produzione di acidi grassi volatili da reflui di industria dolciaria in reattore sequenziale (aa 2018/2020).

Enrico Giacomelli. Titolo: Studio per l'ottimizzazione della produzione di acidi grassi volatili da scarti agricoli e reflui zootecnici (aa 2018/2020).

Vadim Scerbacov. Titolo: Studio sul potenziale recupero di fosforo dal digestato agricolo ultrafiltrato (aa 2018/2019).

Ivan Bombaci. Studio dei metodi per l'ottimizzazione della nitrificazione parziale integrata in bioprocessi per il recupero di risorse (aa 2017/2018).

Daniele Cova. Studio di processi enzimatici coinvolti nella produzione di acidi grassi volatili da fanghi primari cellulosici (aa 2017/2018).

Virginia Tosi. Produzione di acidi grassi volatili a catena corta tramite fermentazione acidogenica di acque reflue di industria alimentare (aa 2017/2018).

Nike Schiavo. Studio della produzione e recupero di VFA tramite fermentazione acidogenica e distillazione di reflui da industria dolciaria (aa 2017/2018)

Silvia Pituello. Produzione e recupero di polidrossialcanoati (PHA) e rimozione biologica dell'azoto via-nitrito da surnatanti anaerobici (aa 2016/2017).

Eduardo Bulgarelli. Studio del pretrattamento enzimatico di biomasse agricole e ottimizzare la produzione di biogas (aa 2016/2017).

Anita Rizzini. Preliminary study to enhance the production of targeted volatile fatty acids and phosphorus removal from cellulosic primary sludge (aa 2016/2017).

Luca Carboniero. Biorefinery of cellulosic primary sludge for the production of short-chain fatty acids (aa 2016/2017).

Gianluca Fasolo. Processi via-nitrito per la produzione biologica di polidrossialcanoati (PHA) da fanghi primari cellulosici. (aa 2016/2017).

Master's thesis advisor (LM7 and LM8):

Fasolo Gianluca. Titolo: Processi via nitrito per la produzione biologica di polidrossialcanoati (PHA) da fanghi primari cellulosici (aa 2016/2017)

Anita Rizzini. Titolo: Production of PHA-bioplastics through isolated *Thauera* sp. using bio-based Volatile Fatty Acids (aa. 2018/2019)

Nicolò Rodighiero. Titolo: Polyhydroxyalkanoates (PHA) production by *Thauera* sp and candy wastewater as carbon source (aa 2019/2020).

Marco Tani. Titolo: Recenti progressi nella comprensione dei processi di nitrificazione ad alte temperature per il trattamento di reflui ad alto carico azotato (aa 2019/2020).

Supervisor or co-reporter of master's thesis (LM8) from 2019 to 2021:

Anna Zuliani. Titolo: Produzione di biomassa microbica da scarti agricoli come potenziale ingrediente proteico per l'acquacoltura (aa 2020/2021).

Eliana Gasparotto. Titolo: Da scarto a risorsa: economia circolare mediante la valorizzazione di digestato anaerobico come fonte di nutrienti per la crescita di microalghe. (aa 2020/2021) (co-relatore).

Mattia Ambrosi. Titolo: Isolamento e analisi di consorzi microbici mesofili e termofili per l'identificazione di nuovi enzimi lignocellulolitici. (aa 2020/2021) (co-relatore).

Doctoral dissertation evaluator:

Candidata: Silvia Palmieri. Titolo: Valorizzazione di sottoprodotti industriali a base biologica

per applicazioni innovative in ingegneria. Supervisore: Francesca Tittarelli, Università Politecnica delle Marche, Scuola di Dottorato di Ricerca in Scienze dell'Ingegneria, Corso di Dottorato in Ingegneria Industriale.

Candidato: Giampietro Chinellato. Titolo: Optimization of Semy-Dry anaerobic digestion for a wider diffusion of the Food Waste treatment for energy recovery. Technical and Economic evaluation. Supervisore: Cristina Cavinato, Università Ca' Foscari – Venezia, Scuola di Dottorato di Ricerca in Scienza e Tecnologia, Corso di Dottorato in Scienze Ambientali.

Candidata: Nagore Guerra Gorostegui. Titolo: Obtaining new-generation fuels and bio-based fertilisers from sludges through biodrying and advanced composting technologies to enhance the overall resource recovery of the water sector. Supervisore: Sergio Ponsá and Belén Puyuelo, BETA technological center, University of VIC, Spain.

6.1 Teaching at foreign universities

- Teaching (1 hour) by invitation to the Master's degree program "Environmental Engineering" at the University of Barcelona. (21/11/2019).

- Teaching during the Environmental Technologies course of the Bachelor's Degree in Chemical Engineering at the University of Barcelona. Teaching title: "Carbon to biopolymer recovery from raw materials: how long do we still have to wait?" (11/12/2018)

- Teaching during the Master of Environmental Engineering and Water Treatment course at the University of Barcelona. Teaching title: "New targets for wastewater treatment plant: from energy consuming to biorefinery" (12/12/2018).

- Teaching during the Energy Management course of the Bachelor of Environmental Science at the University of Barcelona. Teaching title: "Energy-efficient WWTP to WRRF towards the circular economy concept" (12/12/2018).

- Teaching in the Master's program "Water Engineering" at Brunel University of

London (UK), Department of Civil Engineering. Teaching covered fundamentals of municipal wastewater and sewage sludge treatments, anaerobic treatments and exercises, 2016

6.1 *Teaching in specialized courses related to municipal and industrial wastewater treatment.*

- May 2014, respirometer methods module for treatment capacity assessment of sewage treatment plants and practical laboratory applications to the 2nd-level Master's degree in "Chemical Engineering of Water Purification and Renewable Energy"

- From November 2014 to January 2015, tutoring for practical laboratory activities for the course Fundamentals of Chemical Plants and Bioprocesses, University of Verona.

- From October 2015 to February 2016, Nicola Frison was lecturer for the specialized course "Industrial Wastewater Treatment" and "Advanced Processes for Wastewater Treatment" organized by the Federation of Scientific and Technical Associations (FAST) (Coordinator Prof. Renato Vismara - Politecnico di Milano). Lecture title: Emerging pollutants: evidence and regulations; The purification of hazardous substances at low levels: ozone, activated carbon, etc.

- Training seminar (2 hours) "Water: wastewater advanced treatment and energy recovery" having as subject "Fermentation (acidogenic and alkaline) for the valorization of organic substrates (primary, mixed and F.O.R.S.U. sludge) and the treatment of urban wastewater. Theory, sizing and real-world case studies." and "UASB/EGBR (Up-flow Anaerobic Sludge Blanket/Enhanced Granular Bed Reactor) for High Organic Load Wastewater Treatment. Theory, sizing and real case studies" at ETC engineering (May 21, 2018).

- Training seminar (2 hours) "Water: wastewater advanced treatment and energy recovery" having the subject "Recovery and reuse of VFA and biopolymers: regulatory aspects, mass balances, case studies, future prospects" at ETC engineering headquarters (April 09, 2019).

7 Research experience

The research activities carried out by Nicola Frison at the Department of Biotechnology are or have been part of European, national and regional research projects and programs, in particular:

- REFRAIME project (H2020 MSCA- EU);
- 2b-NITRICA project (Joint Research call 2021, co-funded by University of Verona and FUTURA CONCIMI)
- ECODPI project (POR/FESR, Veneto Region);
- CIRCFORBIO Project (LIFE18 CCM/GR/001180);
- CIRCULARBIOCARBON project (Bio Based Industries Joint Undertaking, Grant agreement 101023280);
- SMART-PLANT Project (Horiozo2020 Gran Agreement number);
- IntCATCH Project (Horizon 2020, Grant Agreement number 690323);
- ENERWATER project (Horizon2020, Grant agreement number 644771);

- LIEWASTE Project (LIFE+, LIFE12 ENV/CY/000544);
- Valorgas Project (FP7 programs, Grant Agreement 241334).

The research activities of Nicola Frison have been focused on the following two main topics:

- 1) Advance and innovative biological processes for wastewater treatment:
 - Design, implementation, verification and validation of advanced biological processes for nitrogen and phosphorus removal via-nitrite from nitrogenous wastewater (e.g. anaerobic digestate of sewage sludge, zootechnical effluents) in pilot, demonstrative and full scale Sequencing Batch Reactor (SBR);
 - Treatment of low strength wastewater for nitrogen and phosphorus removal via-nitrite (e.g., nitrification and denitrification, deammonification);
 - Anaerobic treatment of high and low strength organic wastewater for COD removal and biogas production (e.g., Upflow Anaerobic Sludge Blanket).
- 2) Resource recovery from organic waste and wastewater:
 - Production of microbial proteins and polyhydroxyalkanoates (PHA) from mixed and pure cultures cultures;
 - Volatile Fatty Acids (VFAs) production and recovery through acidogenic fermentation of putrescible organic matter, (e.g. sewage sludge, OFMSW);
 - Cellulose and phosphorus recovery (e.g. struvite) from sewage sludge and zootechnical effluents.

Nicola Frison was involved in other research topics as following reported:

- Fate and effects of pharmaceuticals on biological processes for nitrogen and phosphorus removal;
- Real-time control, automation and monitoring of biological processes for nitrogen and phosphorus removal;
- Technologies for removal of emerging compounds in municipal and industrial wastewater.

7.1 Research period abroad

Nicola Frison was granted for the “Short Term Scientific Mission (STSM)” by the COST Action ES1202. Hosted institute: REQUIMTE/CQFB in the Department of Chemistry, Science and Technology Faculty, New University of Lisbon). Local supervisor: Prof. Adrian Oehmen. Period of investigation: from October to December 2013.

The objective of the STSM was the INVESTIGATION AND OPTIMIZATION OF THE BIOLOGICAL PHOSPHORUS REMOVAL VIA NITRITE AND BIOPOLYMER PRODUCTION TREATING ANAEROBIC SUPERNATANT FROM SEWAGE SLUDGE DIGESTION. The products resulting from the STSM were the following scientific publications:

-**N. Frison**, E. Katsou, S. Malamis, A. Oehmen, F. Fatone Development of a Novel Process Integrating the Treatment of Sludge Reject Water and the Production of

Polyhydroxyalkanoates (PHAs). «ENVIRONMENTAL SCIENCE AND TECHNOLOGY» vol. 49, 10877–10885.

-**N. Frison**, E. Katsou, S. Malamis, A. Oehmen, F. Fatone Nutrient removal via nitrite from reject water and polyhydroxyalkanoate (PHA) storage during nitrifying conditions «JOURNAL OF CHEMICAL TECHNOLOGY AND BIOTECHNOLOGY» DOI 10.1002/jctb.4487

-**N. Frison**, E. Katsou, S. Malamis, F. Fatone, A. Oehmen, A novel PHA production and nitrification process for treating anaerobic supernatants in Conference Proceedings - ecoSTP2014 , Atti di "2nd IWA Specialized International Conference ecoSTP2014, EcoTechnologies for Wastewater Treatment: Technical, Environmental & Economic Challenges" , Verona (Italy) , 23-25 June 2014 , 2014

7.2 Scientific production

Nicola Frison is author or co-author of 66 publications in peer-reviewed journal cited around 1600 times for a total H-index of 25. Specifically, more than 85 percent of the published papers are in the fields of Environmental Sciences (28.6 percent), Chemical Engineering (20.1 percent), Chemistry (12.3 percent), Engineering (12.3 percent) and Energy (13.0 percent).

The total Impact Factor calculated on products that have appeared in indexed journals is 501,7 for an average impact factor per product of about 8.22. The average number of citations per publication is currently 24.

7.3 Publication with impact factor

2022

Noutsopoulos, Constantinos, Gkoutzioupa, Victoria, Katsou, Evina, Frison, Nicola, Fatone, Francesco, Malamis, Simos (2022). Integrated selection of PHA-storing biomass and nitrogen removal via nitrite from sludge reject water: a mathematical model. ENVIRONMENTAL TECHNOLOGY, p. 1-14, ISSN: 0959-3330, doi: 10.1080/09593330.2022.2099311

Ribeiro, JM, Conca, V, Santos, JMM, Dias, DFC, Sayi-Ucar, N, Frison, N, Oehmen, A (2022). Expanding ASM models towards integrated processes for short-cut nitrogen removal and bioplastic recovery. SCIENCE OF THE TOTAL ENVIRONMENT, vol. 821, p. 1-10, ISSN: 0048-9697

Rizzioli, F., Bertasini, D., Bolzonella, D., Frison, N., & Battista, F. (2022). A critical review on the techno-economic feasibility of nutrients recovery from anaerobic digestate in the agricultural sector. Separation and Purification Technology, 122690.

Andreolli, M., Scerbacov, V., Frison, N., Zacccone, C., & Lampis, S. (2022). Thauera sp. Sel9, a new bacterial strain for polyhydroxyalkanoates production from volatile fatty acids. New Biotechnology, 72, 71-79.

Pesante, G., Zuliani, A., Cannone, E., Greco, F., Tesoriero, C., Vettori, A., & Frison, N. (2022). Biological conversion of agricultural residues into microbial proteins for

aquaculture using PHA-producing mixed microbial cultures. *Journal of Cleaner Production*, 378, 134554.

Critelli, P., Pesante, G., Lupinelli, S., Modesti, M., Zanatta, S., Battista, F., ... & Frison, N. (2022). Production and characterisation of PHAs by pure culture using protein hydrolysates as sole carbon source. *Environmental Technology & Innovation*, 28, 102919.

Bagatella, S., Ciapponi, R., Ficara, E., Frison, N., & Turri, S. (2022). Production and Characterization of Polyhydroxyalkanoates from Wastewater via Mixed Microbial Cultures and Microalgae. *Sustainability*, 14(6), 3704.

2021

Foglia, A., Bruni, C., Cipolletta, G., Eusebi, A. L., **Frison, N.**, Katsou, E., Akyol C. & Fatone, F. (2021). Assessing socio-economic value of innovative materials recovery solutions validated in existing wastewater treatment plants. *JOURNAL OF CLEANER PRODUCTION*, 322, 129048.

Rizzioli, F., Battista, F., Bolzonella, D., & **Frison, N.** (2021). Volatile Fatty Acid Recovery from Anaerobic Fermentate: Focusing on Adsorption and Desorption Performances. *INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH*, 60(37), 13701-13709.

Zuliani, L., Serpico, A., De Simone, M., **Frison, N.**, & Fusco, S. (2021). Biorefinery Gets Hot: Thermophilic Enzymes and Microorganisms for Second-Generation Bioethanol Production. *PROCESSES*, 9(9), 1583.

Bruni, C., Foglia, A., Eusebi, A. L., **Frison, N.**, Akyol, C., & Fatone, F. (2021). Targeted Bio-Based Volatile Fatty Acid Production from Waste Streams through Anaerobic Fermentation: Link between Process Parameters and Operating Scale. *ACS SUSTAINABLE CHEMISTRY & ENGINEERING*, 9(30), 9970-9987.

Frison, N., Andreolli, M., Botturi, A., Lampis, S., & Fatone, F. (2021). Effects of the Sludge Retention Time and Carbon Source on Polyhydroxyalkanoate-Storing Biomass Selection under Aerobic-Feast and Anoxic-Famine Conditions. *ACS SUSTAINABLE CHEMISTRY & ENGINEERING*, 9(28), 9455-9464.

Battista, F., **Frison, N.**, & Bolzonella, D. (2021). Can bioplastics be treated in conventional anaerobic digesters for food waste treatment? *ENVIRONMENTAL TECHNOLOGY & INNOVATION*, 22, 101393.

Lorini, L., Martinelli, A., Capuani, G., **Frison, N.**, Reis, M., Sommer Ferreira, B., ... & Valentino, F. (2021). Characterization of polyhydroxyalkanoates produced at pilot scale from different organic wastes. *Frontiers in Bioengineering and Biotechnology*, 9, 52.

Botturi, A., Battista, F., Andreolli, M., Faccenda, F., Fusco, S., Bolzonella, D., Lampis S. & **Frison, N.** (2021). Polyhydroxyalkanoated-Rich Microbial Cells from Bio-Based Volatile Fatty Acids as Potential Ingredient for Aquaculture Feed. *ENERGIES*, 14(1), 38.

Botturi, A., Ozbayram, E. G., Tondera, K., Gilbert, N. I., Rouault, P., Caradot, N., Gutierrez, O., Daneshgar, S., FRISON, N., Akyol C., Foglia, A., Eusebi A.L. & Fatone, F. (2021). Combined sewer overflows: A critical review on best practice and innovative solutions to mitigate impacts on environment and human health. *CRITICAL REVIEWS IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY*, 51(15), 1585-1618.

2020

Bolzonella, D., Battista, F., Mattioli, A., Nicolato, C., **Frison, N.**, & Lampis, S. (2020). Biological thermophilic post hydrolysis of digestate enhances the biogas production in the anaerobic digestion of agro-waste. *RENEWABLE AND SUSTAINABLE ENERGY REVIEWS*, 134, 110174.

Fernández-Domínguez, D., Astals, S., Peces, M., **Frison, N.**, Bolzonella, D., Mata-Alvarez, J., & Dosta, J. (2020). Volatile fatty acids production from biowaste at mechanical-biological treatment plants: Focusing on fermentation temperature. *BIORESOURCE TECHNOLOGY*, 314, 123729.

Righetti, E., Nortilli, S., Fatone, F., **Frison, N.**, & Bolzonella, D. (2020). A multiproduct biorefinery approach for the production of hydrogen, methane and volatile fatty acids from agricultural waste. *WASTE AND BIOMASS VALORIZATION*, 1-8.

Vasilaki, V., Conca, V., **Frison, N.**, Eusebi, A. L., Fatone, F., & Katsou, E. (2020). A knowledge discovery framework to predict the N₂O emissions in the wastewater sector. *WATER RESEARCH*, 178, 115799.

Conca, V., da Ros, C., Valentino, F., Eusebi, A. L., **Frison, N.**, & Fatone, F. (2020). Long-term validation of polyhydroxyalkanoates production potential from the sidestream of municipal wastewater treatment plant at pilot scale. *CHEMICAL ENGINEERING JOURNAL*, 390, 124627.

Benedetti, B., Majone, M., Cavaliere, C., Montone, C. M., Fatone, F., **Frison, N.**, Laganà, A. & Capriotti, A. L. (2020). Determination of multi-class emerging contaminants in sludge and recovery materials from waste water treatment plants: Development of a modified QuEChERS method coupled to LC-MS/MS. *MICROCHEMICAL JOURNAL*, 155, 104732.

Akyol, Ç., Foglia, A., Ozbayram, E. G., **Frison, N.**, Katsou, E., Eusebi, A. L., & Fatone, F. (2020). Validated innovative approaches for energy-efficient resource recovery and re-use from municipal wastewater: From anaerobic treatment systems to a biorefinery concept. *Critical REVIEWS IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY*, 50(9), 869-902.

Da Ros, C., Conca, V., Eusebi, A. L., **Frison, N.**, & Fatone, F. (2020). Sieving of municipal wastewater and recovery of bio-based volatile fatty acids at pilot scale. *WATER RESEARCH*, 174, 115633.

Foglia, A., Akyol, Ç., **Frison, N.**, Katsou, E., Eusebi, A. L., & Fatone, F. (2020). Long-term operation of a pilot-scale anaerobic membrane bioreactor (AnMBR) treating high

salinity low loaded municipal wastewater in real environment. SEPARATION AND PURIFICATION TECHNOLOGY, 236, 116279

Battista, F., **Frison, N.**, Pavan, P., Cavinato, C., Gottardo, M., Fatone, F., Eusebi, A. L., Majone, M., Zeppilli, M., Fino, D., & Bolzonella, D. (2020). Food wastes and sewage sludge as feedstock for an urban biorefinery producing biofuels and added-value bioproducts. JOURNAL OF CHEMICAL TECHNOLOGY & BIOTECHNOLOGY, 95(2), 328-338.

2019

Battista, F., **Frison, N.**, & Bolzonella, D. (2019). Energy and nutrients' recovery in anaerobic digestion of agricultural biomass: An Italian perspective for future applications. ENERGIES, 12(17), 3287.

Garcia, N. H., Mattioli, A., Gil, A., **Frison, N.**, Battista, F., & Bolzonella, D. (2019). Evaluation of the methane potential of different agricultural and food processing substrates for improved biogas production in rural areas. RENEWABLE AND SUSTAINABLE ENERGY REVIEWS, 112, 1-10.

Palmieri, S., Cipolletta, G., Pastore, C., Giosuè, C., Akyol, Ç., Eusebi, A. L., **Frison, N.**, Tittarelli, F., & Fatone, F. (2019). Pilot scale cellulose recovery from sewage sludge and reuse in building and construction material. WASTE MANAGEMENT, 100, 208-218.

2018

Strazzera, G., Battista, F., Garcia, N.H., **Frison, N.**, Bolzonella, D. Volatile fatty acids production from food wastes for biorefinery platforms: A review. JOURNAL OF ENVIRONMENTAL MANAGEMENT, 226, pp. 278-288

Lijó, L., **Frison, N.**, Fatone, F., Gonzales-Garcia S., Feijoo, G., Moreira, M.T. Environmental and sustainability evaluation of livestock waste management practices in Cyprus. SCIENCE OF THE TOTAL ENVIRONMENT, 634, pp. 127-140

Spinelli, M., Eusebi, A.L., Vasilaki, V., Katsou, E., **Frison, N.**, Cingolani, D., Fatone, F. Critical analyses of nitrous oxide emissions in a full scale activated sludge system treating low carbon-to-nitrogen ratio wastewater. "JOURNAL OF CLEANER PRODUCTION, 190, pp. 517-524

Frison, N., Malamis, S., Katsou, E., Bolzonella, D., Fatone, F. Enhanced retention of deammonification microorganisms for the treatment of psychrophilic anaerobic digestate. CHEMICAL ENGINEERING JOURNAL, 344, pp. 633-639

Bolzonella, D., Fatone, F., Gottardo, M., **Frison, N.** Nutrients recovery from anaerobic digestate of agro-waste: Techno-economic assessment of full scale applications. JOURNAL OF ENVIRONMENTAL MANAGEMENT, 216, pp. 111-119

Crutchik, D., **Frison, N.**, Eusebi, A.L., Fatone, F. Biorefinery of cellulosic primary sludge towards targeted Short Chain Fatty Acids, phosphorus and methane recovery. WATER RESEARCH, 136, pp. 112-119

Cingolani, D., Fatone, F., **Frison, N.**, Spinelli, M., Eusebi, A.L. Pilot-scale multi-stage reverse osmosis (DT-RO) for water recovery from landfill leachate. WASTE MANAGEMENT, 76, pp. 566-574

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7.4 Book chapter

2017

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7.5 *Proceedings of National and/or International Conference*

2021

Chairman della sessione “Waste Valorisation III alla conferenza HERAKLION 2021.

Alice Botturi, Marco Andreolli, Jesus Rodriguez Gamero, Silvia Lampis, **Nicola Frison**. Novel approach for polyhydroxyalkanoates (PHAs) production from pure culture and bio-based volatile fatty acids (VFAs). IWA EcoSTP 2021, Milano

Chairman of the session CIRCULAR ECONOMY 4 at the. IWA EcoSTP 2021, Milano

Responsabile scientifico del convegno ACQUARIA “GESTIONE DI ACQUE REFLUE, FANGHI E SCARTI DI PRODUZIONE SECONDO I CRITERI DELLA TRANSIZIONE ECOLOGICA” presso la Verona fiera il 27 ottobre 2021, patrocinato dall’Associazione Ingegneri per l’Ambiente e il Territorio e dall’Ordine degli Ingegneri di Verona e Provincia.

2020

Nicola Frison (2020). La riduzione dei fanghi derivanti dalla depurazione biologica: tecnologie applicabili. Convegno patrocinato da Acque Veronesi, Ordine degli Ingegneri di Verona e Provincia, Provincia di Verona, Regione Veneto e ATO Veronesi. Isola della Scala, Verona.

2019

Nicola Frison (2019). Economia Circolare nell’industria del Settore Idrico Integrato: il progetto europeo Horizon 2020 Smart-Plant. Giornata mondiale dell’acqua. Verona.

Il dott. **Nicola Frison** ha fatto parte dell’organizzazione locale della conferenza IWA Resource Recovery Conference (Venezia, 2019), in cui a svolto il ruolo di responsabile Young Water Professional.

Vincenzo Conca, **Nicola Frison**, Cinzia Da Ros, Matteo Tartini, Alberto Piasentin, Anna Laura Eusebi, Francesco Fatone. Environmental Technology Verification of the FullScale Short-Cut Enhanced Nutrients Abatement (SCENA) Process. IWA Resource Recovery Conference, Venice.

Presentazione di apertura della sessione “Influencing production and the downstream” al 6th workshop specialistico “Mixture Culture PHA” organizzato in occasione della conferenza IWA Resource Recovery Conference, Venezia

Chairman della sessione BIOPOLYMERS AND VALUE-ADDED PRODUCTS RECOVERY: NOVEL TECHNOLOGIES alla Conferenza IWA Resource Recovery , Venice 2019.

Giovanni D'Angelo, **Nicola Frison** (2019). The European Environmental Technology Verification (ETV) of resource recovery solutions: the Horizon2020 case of SCENA system for reject water treatment. FIERA ECOMONDO, Rimini.

Joan Dosta, **Nicola Frison**, David Bolzonella, Joan Mata Alvarez (2019). PHA production from sewage sludge and Organic Fraction of Municipal Solid Waste. VII Jornada Sobre Gestion y tratamiento de LODOSde EDAR, Barcelona.

Nicola Frison, Vincenzo Conca, David Bolzonella, Francesco Fatone (2019). Production of bio-based products from organic waste and municipal wastewater. II Jornada Científico-Técnica. El agua residual como Fuente de recursos, CATEDRA DAM. Valencia.

Nicola Frison, Vincenzo Conca, Cinzia da Ros, Anna Laura Eusebi, Francesco Fatone (2019). Recupero di fosforo e bioplastiche da fanghi di depurazione attraverso il processo SCEPPHAR. AIAT, ACQUARIA, Verona.

Nicola Frison, Vincenzo Conca, Cinzia da Ros, Anna Laura Eusebi, Francesco Fatone (2019) Start-up of the first pilot plant for short-cut enhanced phosphorus and PHA recovery from real sieved wastewater. Gruppo di Ingegneria Chimica dell'Università (GRICU), Palermo.

Nicola Frison, Francesco Fatone (2019). Demonstration of resource recovery from wastewater and related cross-sectorial value chain within Horizon 2020 SMART-PLANT. Gruppo di Ingegneria Chimica dell'Università (GRICU), Palermo.

Miriam Menini, Virginia Tosi, David Bolzonella, Francesco Fatone, **Nicola Frison** (2019). Volatile Fatty Acids production as PHAs precursors from candy manufacturing wastewater. HERAKLION 2019

Nicola Frison, Vincenzo Conca, Cinzia da Ros, Anna Laura Eusebi, Francesco Fatone (2019). Start-up Of The First Pilot Plant For Short-Cut Enhanced Phosphorus And PHA Recovery From Real Sieved Wastewater. HERAKLION 2019.

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N. Frison, F. Fatone. Cellulose, biopolymers and nutrient recovery from sewage sludge and reuse in biobased products in H2020 SMART-Plant European demonstration sites. Sessione “Gestione del ciclo dell’acqua e l’utilizzo dei rifiuti biologici municipali nel contesto dell’economia circolare: dal concetto alla prassi standard”, Ecomondo 2018, Rimini

V. Conca, A. Cherubin, C. da Ros, **N. Frison**, A. L. Eusebi, F. Fatone. Start-up of the first pilot plant for Short-Cut Enhanced Phosphorus and PHA Recovery from real sieved wastewater. IWA World Water Congress & Exhibition. 16-21 Settembre 2018, Giappone.

V. Conca, C. Da Ros, **N. Frison**, A. Piasentin, D. Renzi, F. Fatone. Upgrade of the full-scale Short-Cut Enhanced Nutrient Abatement (SCENA) in Carbonera WWTP. EcoSTP 2018 4th IWA Specialized International Conference June 25th - June 27th, 2018, Western University, London, Ontario, Canada.

V. Conca, C. Da Ros, **N. Frison**, A. Piasentin, D. Renzi, F. Fatone. Polyhydroxyalkanoates and phosphorus recovery at pilot scale through the SCEPPHAR system. EcoSTP 2018 4th IWA Specialized International Conference June 25th - June 27th, 2018, Western University, London, Ontario, Canada.

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T. Alvalino, **N. Frison**, E. Katsou, S. Malamis, F. Fatone, F. Omil. Effect Of Pharmaceutical Products On The Biological Nutrient Removal Via Nitrite. 3rd IWA Specialized International Conference “ECOTECHNOLOGIES FOR WASTEWATER TREATMENT” (ecoSTP16), Cambridge (UK), 27-30 June 2016.

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B. M. D’Antoni, **N. Frison**, F. Fatone. Basic conductivity-based real time control to start-up and steady-state complete or partial nitrification-denitrification in a SBR treating reject water. 3rd IWA Specialized International Conference “ECOTECHNOLOGIES FOR WASTEWATER TREATMENT” (ecoSTP16), Cambridge (UK), 27-30 June 2016.

N. Herrero Garcia, D. Crutchik, **N. Frison**, A. Jelic and F. Fatone. Phosphorus recovery and VFAs production from sewage sludge fermentation. 4th International Conference on Sustainable Solid Waste Management, Limassol (Cyprus), 23-25 June, 2016.

L. Lijó, N. Voulvoulis, **N. Frison**, S. González-García, M. T. Moreira, E. Katsou. Comparative environmental analysis of anaerobic mono-digestion and co-digestion of organic waste. 4th International Conference on Sustainable Solid Waste Management, Limassol (Cyprus), 23-25 June, 2016.

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N. Frison, E. Katsou, S. Malamis, A. Oehmen, F. Fatone. Short-cut Enhanced polyhydroxyalkanoates recovery from sewage sludge. XXI IUPAC CHEMRAWN Conference on "Solid Urban Waste Management" Rome (Italy), 7 April, 2016

F.Fatone, **N. Frison**, D. Renzi. Integrazione energeticamente efficiente della linea fanghi di impianti esistenti con sistemi via-nitrito. Innovative wastewater treatment technologies for the energy saving and environmental protection. Palermo (Italy), 20 May, 2016.

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D. Renzi, **N. Frison**, S. Longo, A. Piasentin, F. Fatone. The first full scale application of the short-cut enhanced nutrients abatement (S.C.E.A.) system at the Carbonera WWTP (Veneto Region, Italy). Ecomondo, Rimini (Italy) 5 November, 2015.

N. Frison, S. Lampis, D. Crutchik, C. Tayà, F. Fatone Integrating the selection of PHA storing biomass and nitrogen removal via-nitrite for the treatment of the sludge reject water. ESBP2015 - 8th European Symposium on Biopolymers, Rome (Italy), 16-18 September 2015, 2015

Aleksandra Jelic, **Nicola Frison**, Silvia di Fabio, Franco Cecchi, Francesco Fatone Monitoring trace PCBs in large industrial centralized wastewater treatment plant. IWA Balkan Young Water Professionals 2015 Thessaloniki, (Greece), 10-12 May 2015

Nicola Frison, Stefano Longo, Daniele Renzi, Francesco Fatone Short-Cut Enhanced Nutrients Abatement (SCENA) From Reject Water: Moving The System Into Practice. IWA Nutrient Removal and Recovery 2015: moving innovation into practice. Gdansk (Poland), May 18-21, 2015

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E. Katsou, Simos Malamis, **Nicola Frison**, Francesco Fatone, Effect of nitrite and external carbon source on the via nitrite biological phosphorus removal , Atti di "IBIC 2014 4th International Conference on Industrial Biotechnology" , Rome (Italy) , 8-11 June, 2014 , 2014

E. Katsou, S. Malamis, **N. Frison**, F. Fatone. Assessing alternative treatment schemes for the decentralized co-treatment of domestic organic waste and wastewater , Atti di "12th IWA Specialist Conference on Small Water and Wastewater Systems & 4th IWA Specialist Conference on Resource Oriented Sanitation" , Muscat, Sultanate of Oman , 2-4 November 2014 , 2014.

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S. Malamis, **N. Frison**, E. Katsou, D. Bolzonella, F. Fatone, Applying the autotrophic nitrogen removal process for the treatment of anaerobic pig slurry in Conference Proceedings - ecoSTP2014 a cura di Roberto Canziani , Francesco Fatone and Evangelia Katsou , Atti di "2nd IWA Specialized International Conference - ecoSTP2014 - EcoTechnologies for Wastewater Treatment: Technical, Environmental & Economic Challenges" , Verona (Italy) , 23-25 June 2014 , 2014 ,

E. Katsou, **N. Frison**, S. Malamis, A. Oehmen., F. Fatone, Impact Of External Carbon Source In Via Nitrite Treatment Of The Sludge Anaerobic Supernatant in Conference Proceedings - ecoSTP2014 a cura di Roberto Canziani , Francesco Fatone and Evangelia Katsou , Atti di "2nd IWA Specialized International Conference - ecoSTP2014 - EcoTechnologies for Wastewater Treatment: Technical, Environmental & Economic Challenges" , Verona (Italy) , 23-25 June 2014 , 2014

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N. Basset, E. Katsou, **N. Frison**, S. Malamis, A. Jelic, F. Fatone, Integrating the selection of PHA storing biomass and nitrogen removal via nitrite in the main wastewater treatment line in Conference Proceedings - ecoSTP2014 a cura di Roberto Canziani , Francesco Fatone and Evangelia Katsou , Atti di "2nd IWA Specialized International Conference - ecoSTP2014 - EcoTechnologies for Wastewater Treatment: Technical, Environmental & Economic Challenges" , Verona (Italy) , 23-25 June 2014

S. Longo, **N. Frison**, E. Katsou, S. Malamis, D. Renzi, F. Fatone, Optimization and impact of sludge alkaline fermentation on nutrient removal from sewage in Conference Proceedings - ecoSTP2014 a cura di Roberto Canziani , Francesco Fatone and Evangelia Katsou , Atti di "2nd IWA Specialized International Conference - ecoSTP2014 - EcoTechnologies for Wastewater Treatment: Technical, Environmental & Economic Challenges" , Verona (Italy) , 23-25 June 2014

F. Fatone, **N. Frison**, E. Katsou, S. Longo, S. Malamis, A. Piasentin, D. Renzi, Short-cut enhanced nutrient abatement (SCENA) from anaerobic supernatant at pilot and full scale in Conference Proceedings - ecoSTP2014 a cura di Roberto Canziani , Francesco Fatone and Evangelia Katsou , Atti di "2nd IWA Specialized International Conference

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S. Longo, **N. Frison**, E. Katsou, S. Malamis, D. Renzi, L.Lijò, F. Fatone, Valorization of sewage sludge for via nitrite nutrients removal from anaerobic effluents , Atti di "Wastewater and Biosolids Treatment and Reuse (WBTR): Bridging Modeling and Experimental Studies." , Otranto (Italy) , June 8-14, 2014

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N. Frison, E. Katsou, S. Malamis, S. Di Fabio, F. Fatone, Enhanced via-nitrite phosphorus removal from nitrogenous anaerobic supernatant in a sequencing batch reactor. , Atti di "13th World Congress on Anaerobic Digestion" , Santiago de Compostela , 25-28 June 2013

Rodriguez-Garcia, **N. Frison**, J.R. Vazquez-Padin, A. Hospido, J. Garrido, F. Fatone, D. Bolzonella, M.T. Moreira, G. Feijoo, Environmental burdens of nutrient removal technologies for the treatment of anaerobic digestion supernatant and its integration in a sewage treatment plant. , Atti di "13th World Congress on Anaerobic Digestion" , Santiago de Compostela , 25-28 June 2013

Rodriguez-Garcia, **N. Frison**, A. Hospido, F. Fatone, D. Bolzonella, M.T. Moreira, G. Feijoo. Environmental cost of using different carbon sources for a nitrite Short-Cut Sequential Bioreactor treating anaerobic supernatant. Atti di "13th World Congress on Anaerobic Digestion" , Santiago de Compostela , 25-28 June 2013.

C. da Ros, C. Cavinato, **N. Frison**, P. Pavan, D. Bolzonella. Acid fermentation of manure and maize silage to support nitrogen removal of anaerobic supernatant: temperature and hydraulic retention time effect. Atti di "13th World Congress on Anaerobic Digestion" , Santiago de Compostela , 25-28 June 2013.

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N. Frison, A. Chiumenti, E. Katsou, S. Malamis, D. Bolzonella, F. Fatone, Mitigating gaseous emissions in the biological nitrogen removal via nitrite process treating anaerobic effluents , Atti di "IWA Regional Conference on Waste and Wastewater Management, Science and Technology," , Limassol, Cyprus , 27-28 June 2013

E. Katsou, S. Malamis, **N. Frison**, J. Santos Silva, V. Grace Barros, F. Fatone,, The effect of nitrogen loading rate on short-cut nutrients removal from low strength UASB effluent for decentralized communities , Atti di "IWA Regional Conference on Waste and Wastewater Management, Science and Technology" , Limassol, Cyprus , 27-28 June 2013

N. Frison, F. Toniolo, E. Katsou, S. Malamis, F. Fatone, Using alternative external carbon sources for enhanced nutrients removal via-nitrite from the anaerobic supernatant of WAS and OFMSW in a Sequencing Batch Reactor , Atti di "Asset

Management for Enhancing Energy Efficiency in Water and Wastewater" , Marbella (Spain) , 24-26 April 2013.

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Rodriguez-Garcia G.; **Frison N.**; Vázquez J.; Hospido A.; Fatone F., Bolzonella D.; Moreira M.T; Feijoo G., Environmental comparison of N and P removal technologies for the treatment of anaerobic digestion supernatant , Atti di "ecoSTP" , Santiago de Compostela , 25-27/06/2012

Frison N., Katsou E., Malamis S., Di Fabio S., Pavan P., Cavinato C., Fatone F., Nitritation-denitritation and enhanced via nitrite biological phosphorus removal from the liquid resulting from the anaerobic co-digestion of WAS and OFMSW , Atti di "Sustainable solid waste management" , Athens - Greece , 28-29 June 2012

2011

Bolzonella D., Cavinato C., Fatone F., **Frison N.**, Pavan P., Anaerobic digestion of livestock effluents, energy crops and agro-waste: renewable energy potential and nutrients management , Atti di "IWA specialist international conference ADSW&EC 2011" , Vienna - Austria , 28 Aug-01 Sept 2011

Fatone F., **Frison N.**, Lampis S., Pavan P., Bolzonella D., Two-stage start-up of a demonstration SBR treating anaerobic digestate of WAS and OFMSW for short-cut nitrogen removal , Atti di "IWA specialist international conference ADSW&EC 2011", Vienna - Austria , 28 Aug-01 Sept 2011

7.6 Awards for research and innovation activities.

On October 20, 2020, Dr. Nicola Frison as the main contact person obtained the publication of the environmental technology verification of SCENA (Short-Cut Enhanced Nutrients Abatement) technology in the official channels of the European Commission (https://ec.europa.eu/environment/ecoap/etv/scena-short-cut-enhanced-nutrients-abatement_en)

Nicola Frison was awarded by AnoxKaldnes Cella™ Technologies – Veolia for the excellence in contribution to advancements in the science and engineering of PHA production and valorisation, September 2015.

7.7 Referee for international ISI journals or international projects

Nicola Frison is reviewer for the following ISI journals:

Process Biochemistry (Elsevier), Chemical Engineering Journal (Elsevier), Water Science and Technology (IWA Publishing), Desalination (Elsevier), Industrial Engineering and Chemistry Research (ACS), Desalination and Water Treatment (Desalination Publications), Waste Management and Research (SAGE Journals), New Biotechnology (Elsevier), Waste Management (Elsevier).

Nicola Frison was the reviewer for a research proposal submitted to the *EXECUTIVE GOVERNMENT AGENCY OF NATIONAL SCIENCE CENTER (Narodowe Centrum Nauki – NCN; <http://www.ncn.gov.pl>)*, 2015

Nicola Frison è Guest Editor per la special Issue "Sustainable Reuse of Municipal Wastewater: Innovations and Challenges", appartenente alla sezione "Environmental Sustainability and Applications" (Sustainability, MDPI)

7.8 Member of international conferences

Nicola Frison has been or is a co-organizer of the following international conferences:

Nicola Frison was member of the organizing committee for the international conference “Sustainable Solid Waste Management (<http://www.tinos2015.uest.gr/index.php/committees/organizing-committee>), Tinos island, Greece, 2015

“3rd Resource Recovery Conference – International Water Association”, Venice, dal 08 al 12 Settembre 2019 (<https://www.iwarr2019.org/conference/committees/organizing-committee/>)

Scientific coordinator of the ACQUARIA conference "MANAGEMENT OF WASTE WATER, SLUDGE AND PRODUCTION WASTES ACCORDING TO THE CRITERIA OF ECOLOGICAL TRANSITION" at the Verona fiera on Oct. 27, 2021, sponsored by the Association of Engineers for the Environment and the Territory and the Order of Engineers of Verona and Province.

8 Third mission activities

8.1 Patents

Nicola Frison has the co-property of the following inventions:

- 1) n. MI2013A000946, data invention 10/06/2013, la quale recita “Processo per la purificazione di liquami municipali, zootecnici e/o industriali mediante rimozione di azoto ammoniacale e fosfati da un surnatante anaerobico”.
- 2) n. MI2014A002223, data invention 23/12/2014, “PROCESSO PER LA PREPARAZIONE DI BIOPLASTICHE”.
- 3) Processo e relativo impianto per la rimozione e il recupero di azoto ammoniacale da reflui contenenti azoto”. File number 22155989.1, 9th of February 2022.

8.2 Spin-off company, University of Verona

From 2013 to 2019, Nicola Frison was co-founder of the spin-off company INNOVEN Srl (www.innoven.it). In October 2015, he became CEO of the company.

On behalf of INNOVEN Srl, Nicola Frison carries out activities for the development and transfer in the market of new innovative and sustainable bioprocesses for wastewater treatment, PHA production, energy and nutrients recovery from biowaste and wastewater.

According with these expertizes, INNOVEN Srl is beneficiary of the following EU projects:

- Bio-Based industries (H2020-BBI-JTI-2018) INGREEN Bio-based ingredients for sustainable industries through biotechnology (Grant Agreement 838120)
- Bio-Based Industries (H2020-BBI-JTI-2016) “AFERLIFE” Advanced Filtration TEchnologies for the Recovery and Later conversion of relevant Fractions from wastewater (Grant-Agreement 745737).
- Horizon2020 “Innovative approaches to turn agricultural waste into ecological and economic assets (NOAW)” (H2020-WASTE-2015-two-stage, 2016).

8.3 Technical-scientific consultancy

Nicola Frison was technical and operative advisor for the following projects:

Zuegg Spa. Collaboration agreement for study of measures to prevent sulfite formation in wastewater from the Zuegg plant on Via Francia in Verona.

Fidia Farmaceutici SpA. Technical-scientific collaboration agreement for verification and functional optimization of biotechnological processes and plants of the company's wastewater treatment plant.

CAP holding. Convention for the technical-scientific drafting of a master plan for circular wastewater management and technical-scientific support for the design and implementation of the production of volatile fatty acids (VFAs) and phosphorus recovery from the Sesto San Giovanni and Robecco sul Naviglio plant.

3 V tech. Study of biological processes in a pilot reactor set up in order to evaluate biological treatability of liquid waste and identify optimal operating conditions for treatment.

Bioreal. Scientific and technical support in the field of water and waste treatment in the civil and industrial sectors.

3 V Green Eagle. ADDENDUM: Technical/scientific support activities in the area of liquid waste treatment, sewage sludge and evaluation of processes for concomitant resource recovery.

Zuccato HC. Study in sequentially charged pilot reactors for comparative evaluation of Rhodobacter sp. mediated purification process versus conventional activated sludge during cellular wastewater treatment.

Zuccato HC. Study performed in pilot reactors for the evaluation of Rhodobacter sp. mediated CO₂ capture as a biogas upgrading system.

ETC Engineering. Scientific and technical consulting in support of corporate R&D projects, feasibility studies and designs for wastewater treatment and reuse plants from industrial wastes, feasibility studies for leachate and organic waste treatment plants.

Algae&Algae. Evaluation of different chemical/physical pretreatments of a substrate composed of microalgae in order to increase its anaerobic biodegradability and its specific methane production.

3 V Green Eagle. Study of the chain of chemical/physical and biological processes of the existing plant, by means of inspections and chemical/physical and respirometric analysis/chemical campaigns, in order to characterize the biomass in terms of treatment capacity and identify criticalities of the process by defining possible corrective actions.

Zuccato HC. Study to evaluate the growth yield of microbial biomass during COD degradation under aerobic and photosynthetic conditions without oxygen supply.
ETC-ENVIS Scientific and technical consulting in support of corporate R&D projects, feasibility studies and designs for wastewater treatment and reuse plants from industrial wastes, feasibility studies for leachate and organic waste treatment plants.

INNOVEN. Technical/scientific assistance in the characterization of wastewater and biomass to be subjected to anaerobic digestion and fermentation processes for the production of high value-added organic compounds.

8.4 Outreach initiatives for children and young people

Participation in the 2017 edition of the "Kids University" initiative organized by the University of Verona for the benefit of pupils of the last three classes of elementary school (III, IV and V) and secondary school to involve them, through a very rich offer of workshops held by researchers and university professors, in the world of research and scientific experimentation

Training seminar (4 hours) at VIVERACQUA representatives having as subject the Calculation of environmental benefits of investments and identification of methodology for calculation of avoided CO₂ emissions: perspective innovative technologies for energy efficiency and emission mitigation. June 25, 2021.

8.5 Outreach initiatives for lay audiences.

Participation in science popularization initiatives such as Researchers' Night and the party organized annually by students in the area of Science and Engineering (over 4,000 attendees annually).

8.6 Professional training activities

Nicola Frison conducted 1 training and in-depth seminar related to winery wastewater treatment for wine industry personnel working at wineries of primary national interest (Zonin, Caviro, Frecobaldi...) organized by Società Trattamento Acque - STA Spa and TERGEO. A project promoted by Unione Italiana Vini (UIV) for the collection, qualification and dissemination of innovative solutions to improve the sustainability of the wine business.

Nicola Frison gave 1 specialized and in-depth seminar on the topic of acidogenic fermentation and anaerobic treatment of wastewater and sewage sludge at the WATER course, organized by ETC environment company at the Trento headquarters.

Nicola Frison (2021). Management and valorization of purified water as an element of sustainable development. 31st World Earth Day. Water and the blue planet. Strategies,

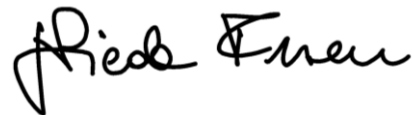
networks and best practices for sustainable consumption. Sustainable Universities Network, Verona.

Nicola Frison (2021). Circular economy and the wine supply chain: high value-added wastes and by-products. VALPOLICELLA. Towards sustainable viticulture in tutale of man and the environment. San Pietro in Cariano, 2021

I hereby consent to the processing of my personal data according with the Italian Law 196/03 “Codice della Privacy”.

Verona, 24/03/2023

Nicola Frison

A handwritten signature in black ink, appearing to read "Nicola Frison", written in a cursive style.