12 PhD positions for the development of *Yeast-based solutions for sustainable Aviation Fuels* with the MSCA-DN YAF

Additional information

Benefits

YAF DCs will be employed according to the rules for DC in MSCA DNs and the general regulations of each host institution. Main features of the open positions are:

1. As reported in the MSCA Work Programme, a financial package which includes:
    a. Living allowance.
    b. Mobility allowance.
    c. Family allowance (if applicable).

    Employer costs and other deductions will depend on recruiting host and country. Allowances are gross amounts, which means that all compulsory social security contributions (employer and employee), direct taxes, and any other compulsory deductions under national legislation will be deducted from these gross amounts.
2. Enrolment in a PhD program.
3. Shared research and innovative multidisciplinary and multisectoral training by experts and experienced trainers from two sectors (academia and industry).
4. An international, multidisciplinary and intersectorial, custom developed training program (soft skill courses, targeted workshops, social events and networking) that promotes scientific excellence and exploits the expertise and infrastructure present in the consortium.
5. 2 Secondments (1 academic secondment and 1 non-academic secondment) at other institutions within the YAF consortium.
6. Opportunities for participation in national and international meetings.
7. Enlarged professional network and improved future scientific career perspective in academia and industry.

Eligibility criteria

Note that MSCA-DN specific eligibility conditions apply:

1. **Mobility rule**. Not have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting beneficiary for more than 12 months in the 36 months immediately before the recruitment date.
2. **Doctoral Candidate (DC) definition**. Be — at the date of recruitment — a doctoral candidate (i.e. not already in possession of a doctoral degree).
3. **Be in position of enrolling in a doctoral programme at the country and meet the specific eligibility requirements at the hosting institution**, if applicable.
4. **Other specific criteria of the recruiting host listed on each position.**

Selection Process

The application process will start on 1st of February 2024 and will end on 29th February 2024.

The selection procedure will be open, transparent, merit-based and in line with the Code of Conduct for the Recruitment of Researchers. All the network institutions are equal opportunity employers and seek a workforce diverse in age, culture, nationality and gender. Candidates that fit best for the different projects will be selected according to the following steps:

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1. Eligibility check. Applications will be reviewed for eligibility based on the criteria listed above under the '*Eligibility criteria*' section.
2. Pre-selection of candidates. Eligible candidates will be ranked based on the submitted documents and shortlisted candidates will be contacted for an online interview. Those not shortlisted will be informed of the result of their application.
3. After the online interviews, candidates will be offered a position or will be informed about the rejection decision.

The outcome of this selection process will be communicated in April 2024. Selected candidates will have 7 days to accept the position.

Selection criteria

1. Adequacy of the candidate's education to the position.
2. Relevant postgraduate work experience.
3. Motivation of the candidate for the position.
4. Effective communication and interpersonal skills (English proficiency).

How to apply

Candidates interested in the positions offered can apply for a maximum of 3 positions (sorted by priority) by the 29th of February 2024.

The application **must include**:

1. YAF Application form filled out and signed.
2. Curriculum Vitae (CV) (max. 3 pages) including relevant education and research experience (including professional experience).
3. Cover letter (max. 2 pages), explaining motivation to apply and relevance of the position for the candidate.
4. Other specific documentation requested by the host institution.

Submission

For the submission of the documentation please refer to the instructions indicated on each position below.

1. Only complete applications will be accepted. Candidates applying for more than one position are requested to submit different applications (3 max).
2. The individual DC projects are set to start in June/July 2024 (or earlier if possible for the host institution and the selected candidate).

For any other enquiries, please send an email to info@yaf-project.eu.

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Individual Research Projects

DC1: SAF intermediates production (FA) from short-chain fatty acids (SCFAs)	
Host Institution	IMDEA Energy (Spain) – Supervisor: Dr. Elia Tomás-Pejó
Duration	36 months
Objectives	Tune the AF conditions of biowastes. Attain the most favourable SCFA profile to be further converted in FA with appropriate chain length for SAF. Screen wild type oleaginous NCY coping with high concentration of SCFAs. Obtain highlytolerant strains to SCFAs by ALE. Optimize the fermentation conditions to attain with high FA content from SCFAs in NCY.
Academic Secondment	4 months at DTU (Denmark) Supervisor: Dr. José Luis Martínez Ruiz
Non-academic Secondment	2 months at Nutropy (France) Supervisor: Dr. M Bendifallah
Specific submission & eligibility criteria of the Host Institution	**Specific requirements** • BSc degree in Microbiology, Biotechnology/Bioengineering, Environmental Engineering or closely related field. • MSc degree in Microbiology, Biotechnology/Bioengineering, Environmental Engineering or closely related field. The selected candidate should be in possession of a MSc degree (or equivalent) by the date of recruitment. **Merits to value** • Previous experience in yeast cultivation. • Previous experience with biorreactors. • Basic knowledge in chromatography. **Submission procedure** • Documentation: revise 'How to apply' section. In addition to that, candidates will be required to send BSc Diploma and proof of being in position of enrolling in a doctoral programme at the date of recruitment (MSc Diploma, proof of enrollment in a MSc Program indicating estimated date of finalisation or equivalent). • Applications should be submitted exclusively via the job portal of IMDEA Energy: https://jobs.energy.imdea.org/

DC2: SAF intermediates production from sugars	
Host Institution	CIEMAT (Spain) – Supervisor: Dr. María José Negro
Duration	36 months
Objectives	Determine the most suitable conditions to obtain tailor-made sugar media from biowastes to produce SAF intermediates, Design and assess the best process strategy to optimize NCY growth for the production of SAF intermediates in sugar-rich media. Explore the effectiveness of enzyme treatment to facilitate the extraction of SAF intermediates from NCY.
Academic Secondment	4 months at ICL (United Kingdom) Supervisor: Dr. Rodrigo Ledesma Amaro
Non-academic Secondment	3 months at BBEPP (Belgium) Supervisor: Dr. Evelien Uitterhaegen
Specific submission & eligibility criteria of the Host Institution	**Specific Requirements** • MSc degree in Microbiology, Biotechnology/Bioengineering, Environmental Engineering, Chemical Engineering, or closely related field. • The selected candidate should be in possesion of a MSc degree by the date of recruitment. **Merits to value** • Mandatory experiences and skills include proven work experience in a biotechnology laboratory setting and theoretical knowledge and practical experience of microbiology. Hands-on experience in microbial cultivation, including laboratory scale bioreactors, and analytical techniques (e.g., HPLC, GC) are highly qualifying merits. • Applicants must be also able to conduct experiments independently, take own initiatives and discuss/develop own ideas, being creative and having a problem-solving ability. **Submission procedure**

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	• Documentation: revise 'How to apply' section. In addition to that, candidates will be required to send BSc Diploma and proof of being in position of enrolling in a doctoral programme at the date of recruitment (MSc Diploma, proof of enrollment in a MSc Program indicating estimated date of finalisation or equivalent). • Applications should be sent by e-mail to info@yaf-project.eu.

DC3: A highly multiplexed CRISPR platform for the production of SAF in *Y. lipolytica*	
Host Institution	ICL (United Kingdom) – Supervisor: Dr. Rodrigo Ledesma Amaro
Duration	36 months
Objectives	New tools to accelerate the production of SAF *Y. lipolytica* by: 1) Development of a multiplexed CRISPR-based toolbox which makes strain improvement 2-5 times faster. 2) Use genome-scale models to predict targets for the multiplexed technology to redirect metabolic fluxes toward SAF precursors. 3) Use the toolbox to accumulate either terpenes or FA.
Academic Secondment	2 months at TUT (Estonia) Supervisor: Dr. Petri-Jaan Lahtvee
Non-academic Secondment	6 months at Nutropy (France) Supervisor: Dr. M Bendifallah
Specific submission & eligibility criteria of the Host Institution	**Specific requirements** • BSc in degree in Microbiology, Biotechnology/Bioengineering, Environmental Engineering, Chemical Engineering, or closely related field. **Merits to value** • Experience and passion for synthetic biology and/or metabolic engineering. • Strong track record and team player. • Capable to work independently. **Submission procedure** • Documentation: revise 'How to apply' section. • Applications should be sent via email to Rodrigo Ledesma Amaro (r.ledesma-amaro@imperial.ac.uk), indicating in the subject of the e-mail: YAF application + DC3 + Name of applicant.

DC4: Design of improved SAF blends using synthetic microbial communities and division of labour	
Host Institution	ICL (United Kingdom) – Supervisor: Dr. Francesca Ceroni
Duration	36 months
Objectives	Explore the possibility to change the composition of the SAF made by one single NCY using synthetic microbial communities: 1) Developing strategies to create *Y. lipolytica* communities based on syntrophy, 2) Engineering syntrophic *Y. lipolyitica* to produce SAFs and maximise the synthesis of a particular SAF using Golden Gate libraries and CRISPR editing methods, 3) Optimise the performance of the community to maximise the production of SAF with enhanced properties.
Academic Secondment	4 months at DTU (Denmark) Supervisor: Dr. José Luis Martínez Ruiz
Non-academic Secondment	3 months at Nutropy (France) Supervisor: Dr. M Bendifallah
Specific submission & eligibility criteria of the Host Institution	**Specific requirements** • BSc in degree in Microbiology, Biotechnology/Bioengineering, Environmental Engineering, Chemical Engineering, or closely related field. **Merits to value** • Experience and passion for synthetic biology and/or metabolic engineering. • Strong track record and team player. • Capable to work independently. **Submission procedure** • Documentation: revise 'How to apply' section.

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	• Applications should be sent via email to Rodrigo Ledesma Amaro (r.ledesma-amaro@imperial.ac.uk), indicating in the subject of the e-mail: YAF application + DC4 + Name of applicant.

DC5: SAF production from residues with newly obtained *R. toruloides*	
Host Institution	TUT (Estonia) – Supervisor: Dr. Petri-Jaan Lahtvee
Duration	36 months
Objectives	Bio-conversion of residual carbon sources into mono-terpenes using *R. toruloides*. Development of new tools for the metabolic engineering. Establishment of rapid screening of terpene producing strains using (FTIR) platform.
Academic Secondment	4 months at IMDEA Energy (Spain) Supervisor: Dr. Cristina González
Non-academic Secondment	2 months at CEPSA (Spain) Supervisor: Dr. Sabino Armenise
Specific submission & eligibility criteria of the Host Institution	**Specific requirements** • BSc and MSc degree in Microbiology, Biotechnology/Bioengineering, Environmental Engineering or closely related field. • The selected candidate should be in possesion of a MSc degree (or equivalent) by the date of recruitment. **Merits to value** • Mandatory experiences and skills include proven work experience in a biotechnology laboratory setting, preferrably related to metabolic engineering of yeasts. Theoretical knowledge and practical experience of microbiology. • Hands-on experience in microbial cultivation, including laboratory scale bioreactors, and analytical techniques (e.g., HPLC, GC) are highly qualifying merits. **Submission procedure** • Documentation: revise 'How to apply' section. In addition to that, candidates will be required to send BSc Diploma and proof of being in position of enrolling in a doctoral programme at the date of recruitment (MSc Diploma, proof of enrollment in a MSc Program indicating estimated date of finalisation or equivalent). • Applications should be sent by e-mail to Dr. Petri-Jaan Lahtvee (petrijaan.lahtvee@taltech.ee).

DC6: Advancing *Debaryomyces hansenii* for production of SAF precursors from algal biomass in open fermentations	
Host Institution	DTU (Denmark) – Supervisor: Dr. José Luis Martínez Ruiz
Duration	36 months
Objectives	1) Develop efficient *D. hansenii* strains for biosynthesis and accumulation of SAF precursors using salt-rich residues as feedstock, in open fermentations, thus significantly reducing production costs. 2) Perform a high-throughput screening using advanced robotics of a *D. hansenii* collection to select strain candidates with an enhanced phenotypic profile in response to salt, 2) Early upstream process design using micro-fermentation systems (BioLector) applying a design of experiment approach and utilizing algal hydrolyzates and sea water as feedstock. 3) Combined transcriptomic + proteomic analysis in the earlier defined cultivation conditions to identify potential gene candidates in the lipid biosynthesis pathway(s) and engineering accordingly to increase the pool of lipid precursors, 4) To assess the production capacity (yields and productivities) in an initial upstream design using highly instrumented lab-scale bioreactors (1 L) and subsequently establishing a suitable fermentation strategy to apply in early scaling-up the process in steel tanks (5 L – 10 L).
Academic Secondment	4 months at CIEMAT (Spain) Supervisor: Dr. David Moreno
Non-academic Secondment	3 months at BBEPP (Belgium) Supervisor: Dr. Evelien Uitterhaegen
Specific submission &	**Specific requirements**

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eligibility criteria of the Host Institution	• MSc degree in Microbiology, Biotechnology/Bioengineering, Environmental Engineering, Chemical Engineering, or closely related field. • The selected candidate should be in possesion of a MSc degree by the date of recruitment. **Merits to value** • Previous experience with microbial cultivations. • Previous experience with bioreactors. • Previous experience with automated liquid handlers / colony pickers. **Submission procedure** • Documentation: revise 'How to apply' section. • Applications should be submitted via the job portal of DTU: https://efzu.fa.em2.oraclecloud.com/hcmUI/CandidateExperience/en/sites/CX_1/job/3137.

DC7: Direct selective catalytic conversion of FA/terpenes to SAF	
Host Institution	ABO (Finland) – Supervisor: Dr. Dmitry MURZIN
Duration	36 months
Objectives	Conversion of microbial oil into SAF via-one pot selective hydrocracking of FA in a continuous reactor over shaped bodies of bifunctional catalysts. Comparison with two-steps process: (hydro) deoxygenation to alkanes of the diesel range and mild hydrocracking to the jet fuel range hydrocarbons 3) Assessing activity, selectivity and stability of new catalysts.
Academic Secondment	3 months at IMDEA Energy (Spain) Supervisor: Dr. Diego Iribarren
Non-academic Secondment	3 months at CEPSA (Spain) Supervisor: Dr. Sabino Armenise
Specific submission & eligibility criteria of the Host Institution	**Specific requirements** • MSc in Chemistry/Chemical Engineering. • The selected candidate should be in possesion of a MSc degree by the date of recruitment. **Merits to value** • Experience in catalysis, physical methods of catalyst characterization, analytical techniques (e.g. GC) and chemical reaction engineering. **Submission procedure** • Documentation: revise 'How to apply' section. • Applications should be sent by e-mail to Prof. Dmitry Yu. Murzin: dmurzin@abo.fi

DC8: Cascade platform conversion of waste-derived-FA into SAF by one-pot catalytic reaction	
Host Institution	CEPSA (Spain) – Supervisor: Dr. Sabino Armenise
Duration	36 months
Objectives	Transformation of biowaste into proper FA using engineered NCY. Conversion of FA into SAF by one-pot catalytic reaction, involving decarboxylation, cracking and proper isomerization reaction lead by novel catalysts.
Academic Secondment	4 months at ICL (United Kingdom) Supervisor: Dr. Rodrigo Ledesma Amaro
Non-academic Secondment	4 months at BBEPP (Belgium) Supervisor: Dr. Evelien Uitterhaegen
Specific submission & eligibility criteria of the Host Institution	**Specific requirements** • BSc degree in Chemical Engineering, Chemistry, Physical Chemistry, Bioengineering, Biotechnology, or a related discipline. • Master's degree in and/or specific courses in a relevant field would be mandatory. **Merits to value** • Catalytic Reactions: Familiarity with heterogeneous catalysts, characterization tools and catalytic reactions, particularly those involving decarboxylation, cracking, and isomerization. • Genetic Engineering: Experience with genetic engineering techniques, such as CRISPR-Cas9, to modify yeast and other microorganisms.

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	• Microbiology: A strong background in microbiology, particularly in the handling and manipulation of yeast and other microorganisms. • Biowaste Transformation: Understanding of the process of transforming biowaste into useful products. • Metabolic Engineering: Understanding of metabolic pathways in yeast and the ability to engineer these pathways for improved production of fatty acids. • Fatty Acid Conversion: Knowledge of the conversion of fatty acids into different forms. • Previous research experience in applied catalysis, chemical process development, yeast genetics, metabolic engineering, or a related area would be beneficial. Research Skills: Ability to carry out experiments with independence, DOE analysis, identify optimal operating conditions, etc. • Laboratory Skills: Proficiency in aseptic techniques, microbial culture, and molecular biology techniques such as PCR, cloning, and DNA extraction. **Submission procedure** • Documentation: revise 'How to apply' section. Please adhere to the number of pages. Number of pages exceeding the indicated thresholds will not be considered. • Applications should be submitted exclusively via CEPSA's job portal (https://jobs.cepsa.com/).

DC9: Production of SAF precursors in an industrially relevant environment: Sustainable recovery and downstream processes	
Host Institution	BBEPP (Belgium) – Supervisor: Dr. Evelien Uitterhaegen
Duration	36 months
Objectives	To develop more sustainable and industrially relevant downstream processing (DSP) strategies for SAF intermediates recovery. Evaluation of different technologies and process conditions considering FA/terpenes recovery as well as energy and material requirements. Benchmarking of green solvents against current commonly used extraction systems. Study the possibility of solvent recycling to allow the development of an industrially feasible process. Fine-tuning of the developed DSP protocol and evaluation through a preliminary techno-economic analysis (TEA) and from an environmental point of view.
Academic Secondment	6 months at IMDEA Energy (Spain) Supervisor: Dr. Diego Iribarren
Non-academic Secondment	2 months at CEPSA (Spain) Supervisor: Dr. Sabino Armenise
Specific submission & eligibility criteria of the Host Institution	**Specific requirements** • Hold, or be close to completing, a Master's degree in Bioscience Engineering, Biotechnology, Chemical Engineering or a related field. **Merits to value** • Previous research experience in bioprocess development or a related field is required. • Motivated to and able to carry out experimental work independently • Experience in experimental design, parameter optimisation, statistical analysis is valued • Previous experience with analytical procedures (e.g., HPLC, GC, TGA) is required. • Previous experience with pre-treatments, extraction and biocatalysis is an asset. **Submission procedure** • Documentation: revise 'How to apply' section. • Applications should be submitted exclusively via BBEPP's jobsite (https://jobs.bbeu.org/en) by uploading the documentation.

DC10: Modelling, optimization and sustainability assessment of alternative systems for SAF production from waste	
Host Institution	IMDEA Energy (Spain) – Supervisor: Dr. Diego Iribarren
Duration	36 months
Objectives	Evaluate the feasibility of different pathways converting biowaste into SAF, hence supporting decision-making processes in the field. Develop adaptative models of the different conversion routes, aligned with the scope of the YAF network, and integrate them

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	into a process simulation. Perform technoeconomic analysis and life cycle sustainability asesssment of the considered systems. Optimize the considered systems based on sustainability results. Interpret the results from a sustainability perspective and benchmark them against reference systems.
Academic Secondment	3 months at ABO (Finland) Supervisor: Dr. Dmitry Murzin
Non-academic Secondment	6 months at BBEPP (Belgium) Supervisor: Dr. Evelien Uitterhaegen
Specific submission & eligibility criteria of the Host Institution	**Specific requirements** • BSc degree in Chemical, Environmental, Energy or Industrial Technology Engineering, or equivalent. • MSc degree in Chemical, Environmental, Energy or Industrial Technology Engineering, or equivalent. The selected candidate should be in possesion of a MSc degree (or equivalent) by the date of recruitment. **Merits to value** • Knowledge of process modelling and simulation; knowledge of life cycle (sustainability) assessment; knowledge of technoecnomic analysis; scientific publications in the field of process simulation and/or life cycle assessment; participation in research projects on systems analysis. **Submission procedure** • Documentation: revise 'How to apply' section. In addition to that, candidates will be required to send BSc Diploma and proof of being in position of enrolling in a doctoral programme at the date of recruitment (MSc Diploma, proof of enrollment in a MSc Program indicating estimated date of finalisation or equivalent). • Applications should be submitted exclusively via the job portal of IMDEA Energy: https://jobs.energy.imdea.org/

DC11: Protein design towards SAF production for *R. toruloides*	
Host Institution	TUT (Estonia) – Supervisor: Dr. P-J. Lathvee
Duration	36 months
Objectives	Enzyme design towards more efficient production of mono-terpenes used in SAFs. Development of bioinformatics tools for enzyme design. Automatization of metabolic engineering and enzyme design and engineering.
Academic Secondment	4 months at ICL (United Kingdom) Supervisor: Dr. Rodrigo Ledesma Amaro
Non-academic Secondment	3 months at Nutropy (France) Supervisor: Dr. M Bendifallah
Specific submission & eligibility criteria of the Host Institution	**Specific requirements** • BSc and MSc degree in Microbiology, Biotechnology/Bioengineering, Environmental Engineering or closely related field. • The selected candidate should be in possesion of a MSc degree (or equivalent) by the date of recruitment. **Merits to value** • Mandatory experiences and skills include proven work experience in a biotechnology laboratory setting and theoretical knowledge and practical experience of microbiology. • Previous experience in bioinformatics is a plus. **Submission procedure** • Documentation: revise 'How to apply' section. In addition to that, candidates will be required to send BSc Diploma and proof of being in position of enrolling in a doctoral programme at the date of recruitment (MSc Diploma, proof of enrollment in a MSc Program indicating estimated date of finalisation or equivalent). • Applications should be submitted exclusively via e-mail to Dr. Petri-Jaan Lahtvee (petrijaan.lahtvee@taltech.ee).

DC12: High-thorughput Adaptive Laboratory Evolution for identification and further optimization of alternative yeasts for lipid precursors accumulation using saline residues containing SCFAs and methanol

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Host Institution	DTU (Denmark) – Supervisor: Dr. José Luis Martínez Ruiz
Duration	36 months
Objectives	To identify and further optimize alternative yeasts from different international strain collections, capable of utilizing SCFAs and/or methanol as feedstock for the bioaccumulation of lipid precursors to be further converted in SAF. Focus in halotolerant/halophilic yeasts capable of withstand higher salt concentrations while utilizing these alternative carbon sources, then using advanced ALE methodologies in mili-scale parallel automated bioreactors to optimize cell performance and later on introduce recombinant biosynthetic pathways to favour the accumulation of lipid precursors, based on the other oleaginous yeasts utilized in this project (Yarrowia, Rhodotorula and Debaryomyces).
Academic Secondment	4 months at IMDEA Energy (Spain) Supervisor: Dr. Elia Tomás-Pejó
Non-academic Secondment	2 months at CEPSA (Spain) Supervisor: Dr. Sabino Armenise
Specific submission & eligibility criteria of the Host Institution	**Specific requirements** • MSc degree in Microbiology, Biotechnology/Bioengineering, Environmental Engineering, Chemical Engineering, or closely related field. • The selected candidate should be in possesion of a MSc degree by the date of recruitment. **Merits to value** • Previous experience with microbial cultivations. • Previous experience with micro and/or lab-scale bioreactors. • Previous experience with transcriptomics / proteomics analysis. • Basic programming skills / bioinformatics (Python). **Submission procedure** • Documentation: revise 'How to apply' section. • Applications should be submitted via the job portal of DTU: https://efzu.fa.em2.oraclecloud.com/hcmUI/CandidateExperience/en/sites/CX_1/job/3137

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