

Promoting Flavor Research amongst PhD Students in Europe Academic Year 2019/20

PROJECT ROAD MAP

June 2019

GIRACT

Website: www.giract.com

Email: info@giract.com

Project sponsored by

DSM FOOD SPECIALTIES
GIVAUDAN
KERRY
KIKKOMAN
LESAFFRE INTERNATIONAL
MCLS EUROPE
NESTLÉ

Project Co-ordinator: Prof. Andy Taylor, University of Nottingham, UK

Organised by

GIRACT

24 Pré Colomb

1290 Versoix/Geneva

Switzerland

Tel: +41 22 779 0500

info@giract.com

CONTENTS

1.	BACKGROUND	3
2.	PURPOSE AND SCOPE.....	4
3.	PROJECT DETAILS	5
4.	TIMELINE	9
5.	CRITERIA FOR SELECTION	10
5.1.	GROUP 1: BEST THESIS.....	10
5.2.	GROUP 2: FIRST YEAR STUDENTS.....	11

1. BACKGROUND

This document presents the planned programme of the industry-sponsored project promoting flavor research amongst PhD students across European Universities and Institutes.

Many of the major, global players in flavor and flavor ingredient production are located in Europe where they make a significant contribution to national economies through their production and R&D activities. Furthermore, flavor and flavor ingredient production, as well as flavor R&D, involve many smaller companies which contribute specific expertise and products to the larger businesses. There are also numerous large and small European companies that use flavor technology to develop their own unique food and beverage products. Although the economic value of these activities to Europe is difficult to estimate accurately, there is a very strong socio-economic case for retaining and supporting these activities within Europe.

In today's global business environment, companies are under constant pressure to consider relocating to alternative sites in the USA or the Far East for marketing reasons and/or financial advantages. In addition, fast-developing economies such as China and India are investing vast sums in basic R&D activities to gain economic advantage over the West. These economies are leveraging their low cost-base to woo basic research away from the West. One decisive factor keeping flavor companies in Europe is the availability of well-trained personnel and a wide range of Universities and Research Institutes that can supply them with research facilities, specialist advice and consultancy services. These Universities and Institutes are already well-connected through various informal mechanisms (e.g. COST actions and scientific meetings such as Weurman and Wartburg). For Europe to compete effectively in flavor R&D against established countries such as the USA and Japan, as well as against fast-rising giants such as China and India, it will need to show a strong, unified and synergistic face in the future.

Following nine highly successful programmes, a unique and focused industry consortium of 7 companies is renewing its support to expand flavor research competence in Europe by encouraging PhD students to select this avenue of research. This PhD Award project is organized by GIRACT (www.giract.com) and is co-ordinated by Prof. Andy Taylor from the University of Nottingham.

2. PURPOSE AND SCOPE

The purpose of this project is to promote innovative flavor research amongst PhD candidates across European Universities and Research Institutes. PhD students enrolled in Universities and Research Institutes from 32 European countries (28 EU countries (including UK), Switzerland, Norway, Turkey and Russia) are eligible to apply. The project targets two different groups of PhD students:

- **Group 1:** those who are about to complete their PhD and hence will soon be exploring opportunities for employment
- **Group 2:** those who are about to commence their PhD studies

This is translated into the following sub-objectives:

- **Publicise the attractions of flavor research** to attract high-calibre students into appropriate PhD courses and then into industry
- For **Group 1 (final year):**
 - Solicit and evaluate innovative flavor research projects
 - Provide GIRACT's Annual Savory Flavor & Food Industry Conference, organised each spring in Geneva, as a platform for the winning student to present his/her work to 'potential employers'
- For **Group 2 (first year):**
 - Award bursaries to a selected number of students who are planning to commence their PhD studies in flavors
 - Provide the 6 winning 1st year PhD students with the opportunity of visiting the laboratory of selected sponsor companies, by using a part of their bursary for travel and stay. This will enable them to obtain a first-hand view of an industry R&D centre

3. PROJECT DETAILS

Group 1: Publicising career opportunities in the flavor industry

The plan is to contact over 260 European Universities and Institutes with strong food and flavor science faculties and to encourage PhD students to participate in an annual competition for 'best thesis' in the flavor area. Innovation will be the key criterion in judging the theses submitted for evaluation. **An award of EUR 5000 will be presented to the author of the best thesis.**

Selection of best thesis

The flavor industry has an on-going need for well-trained people. One of the ways of attracting such people is to encourage students to work towards high-quality and innovative theses.

A Steering Committee, led by Prof. Andy Taylor, will evaluate the theses received and select the most deserving. Giract will invite the winner to the Savory Flavor & Food Industry Conference of the following year where the student will present his/her work to representatives from the sponsoring companies and receive his/her award.

Group 2: Encouraging students into flavor research

There is a need to attract scientists from a wider range of backgrounds, such as chemists and biochemists, to undertake PhDs in flavor, and not only those already studying for a food science/chemistry/technology degree and thus who have already acquired a certain knowledge of flavor through their BSc/Masters studies.

One way of carrying out the above is to award bursaries to students who are just starting a PhD programme to attract them into the flavor area and to show them there is an interest in them (as future employees) from the industry, as shown by the composition of the sponsoring companies. **A bursary of EUR 3000 will be awarded to each of the 6 selected students.** PhD projects and students will be assessed to ensure both meet the eligibility criteria.

In addition, the 6 winning 1st year PhD students will be offered the opportunity of visiting the laboratory of a selected sponsor, by using a part of their winning bursary for their travel and stay. This will enable them to obtain a first-hand view of an industry R&D centre.

The rules and regulations are detailed on a dedicated page on GIRACT's website (www.giract.com/flavor-research-programme.php).

Universities/Institutes are being encouraged to announce the programme on their websites to attract students to flavor studies. Similarly, sponsoring companies are also requested to announce the programme on their respective websites. Selected trade press, including internet-based media, is being approached for news coverage of this programme.

Administration

This programme is administered by GIRACT, an organisation long involved in training and information for the flavor industry (www.giract.com). The aim is to ensure efficient administrative support and the smooth running of the project and its related activities. GIRACT manages the daily administration of the project, including the communication with the Universities/Institutes, contacting companies for financial contributions, liaising with the relevant EU instances, setting up and co-ordinating with Prof. Andy Taylor, posting regular programme updates on social media (LinkedIn, Twitter and Facebook), announcing results, handling the project financials and timely transfer of awards to the selected students, liaising with the sponsoring companies, organising an evaluation meeting and presentation by the laureate of the best PhD thesis award to representatives from the sponsoring companies on the day of the Savory Flavor & Food Industry Conference, etc. Prof. Andy Taylor of the University of Nottingham is responsible for the evaluation of the theses and helps finalising contacts with the Universities/Institutes.

The Best Final PhD Thesis award of EUR 5000 is forwarded directly to the laureate.

The reimbursement of the bursary of EUR 3000 to each of the 6 selected first year PhD students is made based on research-related invoices countersigned by the respective professor and submitted prior to December 31st of the year following the award. Any bursary balance unclaimed by this date is handed over to the department of the respective University/Institute, also on submission of an invoice for the relevant amount.

Sponsor companies

The 7 sponsoring companies are:

- DSM FOOD SPECIALTIES
- GIVAUDAN
- KERRY
- KIKKOMAN
- LESAFFRE INTERNATIONAL
- MCLS EUROPE
- NESTLÉ

Research topics of current interest

GIRACT has asked the sponsor group to suggest current areas of interest which could be examined in the context of new PhD studies. These include:

- Consumer acceptance of and preference for savory products
- Evolution of taste receptors with age
- Natural savory flavors for clean labelling
- Sensory science, consumer insights, market intelligence on labelling of savory products
- Influence of aroma molecules on salt perception (for salt reduction)
- Understanding salt perception and physiology at the receptor level
- Bitterness masking of alternative salts used to replace sodium chloride; solutions from natural or common foods
- Influence of aroma molecules on sweet perception (for sugar reduction)
- Masking stevia off notes
- Enzymatic generation of flavor molecules
- Flavor molecules that can have an impact on satiation (to help people to eat less and lose weight)
- Structure–Function relation of natural taste modulators and its specific mechanisms
- Molecular response to astringency:
 - Taste receptors involved in astringency
 - Different molecules from different classes triggering astringency in sensory evaluations
 - These analyses will help to improve the mechanism and to provide a tool to search for modulators
- Molecular response to licorice and the taste receptors involved in licorice
- Improving palatability of vegetable proteins by enzymatic modification
- Fermented foods/beverages, and impact on flavor, taste, nutrition and health
- Incorporation of Artificial Intelligence in flavor research and/or analysis
- Non–GMO fermentation/enzymatic pathways for production of flavor molecules
- Novel, natural sweet modulation ingredients – not from stevia
- Natural alternatives for carriers, solvents and/or encapsulation systems
- Exploring novel, clean/green methods for extraction of flavor and taste components from natural sources
- Interaction of flavor ingredients with novel protein sources; identifying natural off-note masking ingredients for plant–based proteins

- Unveiling the molecular taste and flavor complexity/richness of ethnic culinary dishes, and understand how they drive preference
- Changes in the flavour components (leading to typical Asian flavour) by Maillard reaction by heating Japanese type soy sauce
 - Sensory and LG-MS-MS evaluation/detection methodologies of complex Maillard key components in heated treated soy sauce
 - Development of methods to extract and store flavour components in stable condition to conduct sensory evaluation in further consumer tests
- Interactions between aroma volatiles and taste active compounds to enhance salty and umami perception (savory context)
- Flavor reactions in innovative food grade reaction media
 - Consumer friendly food grade deep eutectic solvents can be used as reaction media to generate desired flavours with high yields from precursor rich ingredients. The objective of this study is to develop an understanding of reaction pathways and the influence of reaction parameters
- Interactions of taste active peptides in culinary matrices, and their impact on sensory characteristics
 - Synergistic effects between taste active peptides can enhance taste perception. The objective of this study is to develop an understanding of the relationship between molecular structures and their taste impact, and these synergetic effects

4. TIMELINE

Group 1 (Best thesis award):

- October 31, 2019 – Application by candidates
- December 13, 2019 – Submission of relevant documents for evaluation
- End January 2020 – Winner to be announced by Steering Committee
- March 26/27, 2020 – Project evaluation meeting with representatives from sponsoring companies in Geneva, and presentation of best thesis by winning candidate

Group 2 (6 bursaries to first year PhD students):

- October 31, 2019 – Application and submission of relevant documents
- December 20, 2019 – Announcement of results
- January–December 2020: period during which the selected students will be reimbursed research-related expenses against countersigned invoices. Any unspent bursary amount within this deadline will be handed over to the department of the respective university/institute, on submission of an invoice for the relevant balance
- June 30, 2020 – Bursary winners submit a short summary of mid-year research progress
- December 31, 2020 – Bursary winners submit a short summary of the full year research progress
- Details of visits to certain sponsor company laboratories will be communicated to the winning students who wish to take advantage of this opportunity

5. CRITERIA FOR SELECTION

5.1. GROUP 1: BEST THESIS

Criteria for Best Thesis

Criteria	Description
Eligibility	<p>The applicant must be enrolled in a relevant European university/ institute for his/her PhD study</p> <p>Any flavor related project that has led to the submission of a PhD in 2019 can be considered</p> <p>The applicant should not be already sponsored by, and/or bound to, a commercial organization</p>
Thesis	<p>The thesis should clearly explain the starting hypotheses or the goals and aims of the work</p> <p>Research does not necessarily need to be restricted to scientific aspects, but can also cover other features of flavor science such as business policy, marketing, legislation, consumer impact, etc.</p> <p>Clarity of expression and effective communication of results is a key aspect in assessing the thesis</p> <p>Appropriate data analysis should be evident</p> <p>Clear abstracts and summaries are expected</p> <p>Clear Figures and Tables are expected</p>
Novelty	<p>All PhD studies should contain a degree of novelty and this will be part of the judging criteria. Novelty may be a new method for studying flavor, or new findings, or some other aspect of the PhD study</p>
Results	<p>The results should show good experimental design and robust methodology, e.g. adequate replication and sampling to support the conclusions</p>
Publications	<p>Some theses are composed of published papers, others are more narrative in style. Thus, the judging criteria will take these different styles into consideration and publication of the thesis results will <u>not</u> be an essential criterion for judging</p>
Language	<p>English. If the thesis is not in English, the 10 pages summary must be in English</p>
Application and Submission	<p>Evidence of enrolment and thesis submission in 2019 at the university/ institute should be provided by the student. The electronic copy of the thesis must be countersigned by the Professor</p>

5.2. GROUP 2: FIRST YEAR STUDENTS

Criteria for First Year PhD Applicants

Criteria	Description
Eligibility	<p>Projects must be designed for the award of PhD or equivalent</p> <p>The student must be formally enrolled in a relevant European university/ institute in 2019 and the project must have started in 2019 or in the academic year 2019/2020</p> <p>The applicant should not be already sponsored by, and/or bound to, a commercial organization</p>
Student	<p>Can be from any scientific background but one aim of the bursaries is to attract students who have not studied Food Chemistry, Food Science or Food Technology to enter the food flavor area</p> <p>Projects do not necessarily have to be restricted to scientific aspects, but can also cover other features of flavor science such as business policy, marketing, legislation, consumer impact, etc.</p>
Novelty	<p>A brief summary of the work should clearly state the background to the project, the hypotheses to be tested and explain the novelty of the work and its potential to further our understanding of flavor</p>
Interdisciplinary	<p>Projects that involve training the student in more than one scientific discipline will be favoured</p>
Experimental design and data analysis	<p>All projects should describe appropriate methodology for experimental design and data analysis</p>
Language	<p>English</p>
Application	<p>All documents should be countersigned by the Professor concerned. The application should be sent electronically. Evidence of enrolment in the academic year 2019/2020 at the university/institute should accompany the documents.</p>
Bursary	<p>The one-off bursary of EUR 3000 will be awarded during 2020 to the 6 selected first year PhD students. Bursary payment(s) will be based on research-related invoices countersigned by the respective professors. Invoices can relate to expenses such as purchase of equipment, databases, participation in conferences, visits to laboratories, etc. The 6 winning 1st year PhD students will be offered the opportunity of visiting the laboratory of a selected sponsor company. Any unused part of the bursary will be handed over to the respective department of the university/institute by December 31, 2020 against submission of an invoice for the relevant balance.</p> <p>Bursary winners will need to submit mid and full year short summaries of research progress. The progress reports will be due on June 30, 2020 and December 31, 2020.</p>