

Claire Duménil

Current position July 2025 - September 2025

Postdoctoral research fellow: Technology-guided monitoring of pest infestation in common crops

Prof. Luca Cappellin, University of Padova, Italy

Taking part in several projects to assess volatile profiles in common Italian crops for import/export under pest insect infestation. European project PURPEST (DOI: 10.3030/101060634).

Education

2015-2019 Doctor of Philosophy (PhD) in Biological Sciences. Cardiff University, UK

BBSRC- SWBio DTP PhD training program and doctoral school of Biosciences, Cardiff University.

Dissertation: Encoding of fruit odours by the peripheral olfactory system in *Drosophila suzukii*: Fruit prints for host selection and prospects for sustainable management

Supervision: Dr W. van der Goes van Naters, Prof. W. Symondson, Prof. J. Pickett, Cardiff University

Dr M. Birkett, Dr J. Vuts, Dr J-J. Zhou, Rothamsted Research.

Examination: Dr J. Hodge, Bristol University, Dr C. Müller, Cardiff University

2011-2013 Master of Sciences (Msc) in Ecology and Evolution. University of Amsterdam, NL

Research project 2: The efficacy of essential oil compounds to repel and/or kill *Anopheles gambiae*.

Supervision: Dr F. Chandre, IRD and Dr T. Martin, CIRAD, Montpellier, France

Research project 1: Effects of food on the composition of sex pheromones in *Heliothis virescens*.

Supervision: Prof. A.T. Groot, IBED, University of Amsterdam, NL

Literature review: The role of chemoreception in herbivorous insects.

Supervision: Prof. P. Roessingh, IBED, University of Amsterdam, NL

2008-2011 Bachelor of Sciences (Bsc) in Ecology and Physiology, University of Caen, France

Research project: Cephalopod Recruitment from English Channel Spawning Habitats (CRESH).

Supervision: Prof. J-P. Robin, UMR-100 IFREMER, University of Caen Normandy

Research work experience

2024-2025 Postdoctoral research assistant: Improving soil-plant-insect interactions to promote pollinators

Prof. S. Angeli, Free University of Bozen-Bolzano, Italy

Project planning to collect sunflower volatiles in field and greenhouses, perform electrophysiological recordings with honey bees, behaviour and data analysis. I identified the major differences pollinator's attraction and headspace volatiles in sunflowers grown with different endophytic soil communities. Collaboration with Prof. Luca Cappellin (University of Padova) and Prof. Diana di Gioia (University of Bologna).

2021-2023 Postdoctoral research assistant: Functional brain imaging of *Drosophila suzukii*

Prof. Albrecht Haase, Center for Mind/Brain Sciences CIMeC, Rovereto, Italy

Co-design and funding acquisition. Project planning to get transgenic *Drosophila* flies, perform microdissection, immunostaining, 2-photon microscopy, behaviour and data analysis. I revealed significant odour coding patterns in the antennal lobe and differences between *Drosophila* species that appear linked to evolutionary events. I co-created international collaborations to develop projects with genetic engineering and machine learning in the service of integrated pest management. Manuscript published.

2019-2020 Postdoctoral research assistant: Reduce insecticide use against the pest *Drosophila suzukii* via the development of a yeast-based trapping lure.

Prof. S. Angeli, Free University of Bozen-Bolzano, Italy

Project planning to perform electrophysiological recordings with flies, volatile compounds collections on yeast and plants in field and data analysis. Collaboration with Dr S. Schmidt and Dr D. Eisenstecken, Laimburg Research centre (Italy) and Prof. P. Becher, SLU Lund (Sweden). I revealed differences in the detection of different yeast strains and identified relevant chemicals which can be used in management programs. Manuscripts published.

2015-2019 PhD researcher: Detection of host odours by the peripheral olfactory system in the invasive agricultural pest *Drosophila suzukii* and provide novel semiochemical management tools.

Dr W. van der Goes van Naters, Prof. W. Symondson, Prof. J. Pickett, Cardiff University, UK

Dr M. Birkett, Dr J. Vuts and Dr J-J. Zhou, Rothamsted Research, UK

Project planning in Cardiff University and Rothamsted Research. I performed single cell electrophysiology, volatile collection, designed behavioural experiments and analysed data with my designed statistical analysis. I demonstrated how the peripheral olfactory system encode complex odours from fruits in *D. suzukii* and *D. melanogaster*. I identified the olfactory neurons activated by fruit volatiles and identified bioactive chemicals. I earned several presentation awards and a travel bursary. Three manuscripts are in preparation.

2014-2015 Research assistant: Chemical signaling of oviposition site selection in *Drosophila melanogaster*.

Prof. J-C. Billeter, University of Groningen, NL

Project planning and co-design of behavioural experiments with transgenic flies. Learned *Drosophila* molecular techniques, designed statistical analysis. I revealed odour guided food preference in *D. melanogaster* of diverse mating status. Manuscript published.

2013-2014 Research assistant: The effects of mating disruption techniques on female sex pheromone of *Cydia pomonella* in European apple orchards.

Prof. A. Groot, University of Amsterdam, NL

Project planning and co-design, including field collection, coordination with collaborators and troubleshooting. I identified variation in sex pheromone composition across populations from different management methods in Dutch, Spanish and Canadian apple orchards. Manuscript published.

2013 (6M) Msc project: Effects of essential oil compounds against *Anopheles gambiae*.

Dr F. Chandre, IRD and Dr T. Martin, CIRAD, Montpellier, France

Performed behavioural work using WHO-certified methods. I identified four compounds as the most bioactive and additionally with an experiment of my initiative, I identified a difference in efficacy in the DEET- resistant strain. Manuscripts published.

2012 (9M) Msc project: Effects of food on the composition of sex pheromones in *Heliothis virescens*.

Prof. A. Groot, IBED, University of Amsterdam, NL

Project planning including the logistics, troubleshoot and performed experiments using transgenic plants. I found a difference in ratios of components likely associated with deprivation and stress. I presented the results.

2011 (2M) Bsc internship: Cephalopod Recruitment from English Channel Spawning Habitats.

Prof. J-P. Robin, UMR-100 IFREMER, University of Caen, France

As a field assistant I prepared the selection of sampling sites (using ArcGIS 10), guided divers for egg laying site observations and helped the pelagic sampling of juveniles in the English channel in a 5-day mission.

Teaching experience

2024-2025 Teacher assistant in Msc and Bsc practicals

Co-designed and co-led practicals of the Bsc and Msc Entomology courses, including chemical ecology, insect manipulation, dissection and field collections

Prof. S. Angeli, Free University of Bozen-Bolzano, Italy

2012-2025 Supervision and mentoring of Bsc and Msc projects

Mentored Bsc and Msc students through carrying a research project, teaching laboratory techniques, critical thinking, analysis of data and writing a report.

Prof. S. Angeli, Free University of Bozen-Bolzano, Italy

Prof Albrecht Haase, University of Trento, Italy

Dr W. van der Goes van Naters, Cardiff University, UK

Prof. J-C. Billeter, University of Groningen, The Netherlands

Prof. A. Groot and Dr M. Kant, University of Amsterdam, The Netherlands

2016-2017 Teacher assistant for year 1-3 Bsc practicals and marking

Anatomy and physiology: (potato, squid and fish dissections), microbiology and laboratory practices (aseptic laboratory techniques), molecular biology and physiology (Introduction to *Drosophila* genetics)

Prof. W. Symondson, Dr S. Griffith, and Prof. H. White-Cooper, Cardiff University, UK

Fundings awarded

2021 Funding for a 2-years research project by Foundation CARITRO, Trento-Rovereto, Italy

Co- wrote and submitted the project proposal: Functional brain imaging in a novel transgenic model of *Drosophila suzukii*: Towards olfactory-guided pest management

2017 Student Travel bursary from the International Society of Chemical Ecology (ISCE)

Price for best oral presentation at the meeting of ISCE/APACE , Kyoto, Japan

2016 Winner of SCI Agri-Food Career Forum #agrifoodbecause twitter competition animating the importance of research for world food security.

2015-2019 PhD studentship at Cardiff University and Rothamsted Research, UK

Scholarship and studentship awarded by the South West Biosciences Doctoral Training Partnership (SWBio DTP), funded by the Biotechnology and Biological Sciences Research Council (BBSRC)

Technical skills

Office and data analysis

- x Data processing, analysis and statistics on small and medium datasets.
- x Microsoft Office and Apache Open Office suites
- x Data processing softwares: Agilent, Chemstation, Syntech suites, Fiji, AMIRA, Inkscape, GraphPad
- x Data analysis using R, Matlab, Python (beginner proficiency)

Laboratory

- x Analytical chemistry: GC, GC-MS, PTR-MS and PTR-TOF
 - Collection of chemicals from plants and insects in laboratory and field (CLSA, DHC, SPME)
- x Electrophysiology: SSR, EAG and GC-EAD on several insect species
- x Entomology: Behavioural experimentation in laboratory and field
 - Rearing (including transgenic *Drosophila* lines);
 - Handling of live insects (honey bees, wasps, flies) for fine mounting and micro-dissection
- x Plant biology: Growing and maintaining plants including transgenics and soil treatments
- x Molecular biology: PCR, design of primers, crosses of transgenic flies (beginner proficiency)
- x Imaging techniques: Functional and structural in-vivo 2-photon microscopy, video capture of insect behaviour

Practical and interpersonal skills

- x Laboratory and office health and safety, first aid intervention
- x Mental health awareness and stress management
- x Ethics, intellectual property, unconscious bias
- x Team work, conflict management, mentoring
- x Science communication, vulgarisation, outreach
- x European car driving licence

Non academic work experience

Consultant in pest management and organic viticulture and fruticulture

2018 (3M) **Internship** in organic agriculture and viticulture with E. Mescalchin and A. Grassi, Fondazione Edmund Mach, Italy

Valuable communication with researchers and growers regarding the pest *Drosophila suzukii*. I assisted measuring the societal and economic impact of pest insects and the current pest and disease management techniques. I shared how academic research, including my work is helping.

Caretaker

2011 Caretaker for rescued small primates at Stichting AAP, Almere, NL
2010-2011 Childcare provider, O2 services, Caen, France
2004-2009 Self-employed: childcare provider and housekeeping, Caen, France

Industry worker experience

2010-2011 Warehouse packer, Decathlon Oxyane logistics, Cagny, France
2006-2008 Interim warehouse packer, Caen, France

Extra activities and societies

2022- Member of the Royal Entomological Society (RES, UK)

2022 Animator of a discussion on societal impact in neuroscience research at the European Student Conference on Behaviour and Cognition, Rovereto, Italy.

2022- 2023 Role as a representative of Postdocs at CIMeC and the University of Trento

2021- 2023 Member of the Society of Chemical Industry (SCI) Agri-Food Early Career Committee
Equality, diversity and inclusion officer
Activities: Organisation of webinars, photo competitions and mentoring schemes

2021- Member of the reviewing board of MDPI and Wiley (> 5 peer-review activities)

2017- Member of the International Society for Chemical Ecology (ISCE)

Communication and outreach

- 2025** Oral presentation at the German Entomology Congress 2025, Geisenheim, Germany
*The impact of endophytic communities on the volatile organic compound profile of sunflower *Helianthus annuus* and its detection by honey bees*
- 2024** Oral presentation at the European PhD Network "Insect Science" XV annual meeting, CREA, Florence, Italy
*The impact of endophytic communities on the volatile organic compound profile of sunflower *Helianthus annuus* and its detection by honey bees*
- 2023** Poster presentation at CoGEvo23, Rovereto, Italy
*Fruit odour coding in the brain of the agricultural pest *D. suzukii**
- 2023** Oral presentation at the National Conference of Italian Entomological Society (CNIE)
*Fruit odour coding in the brain of the agricultural pest *D. suzukii**
- 2022** Coordinator of round-table discussions at the European Student Conference on Behaviour and Cognition, Rovereto, Italy
Brain and ecology: does animal cognition research benefit only humans?
- 2022** Oral presentation at Ento22, Royal Entomological Society, UK
*Fruit odour coding in the brain of the agricultural pest *D. suzukii**
- 2019** Oral presentation at the FlyTech molecular genetic technique symposium, Cardiff, UK
Imaging of neuron activity via genetically encoded voltage indicators GEVIs
- 2018** Poster presentation at the special Interest group insect behaviour meeting of the Royal Entomological Society, Rothamsted Research, UK
*Induction of host fruit preference in the invasive agricultural pest *D. suzukii**
Description published in the journal *Antennae*
- 2018** SCI Agri-Food Early Career Forum #agrifoodbecause twitter competition 2017
*Host fruit selection by the olfactory system in the invasive agricultural pest *D. suzukii**
Tweet was selected as winner entry
- 2017** Oral presentation at the joined ISCE/APACE meeting, Kyoto, Japan
*Host fruit selection by the olfactory system in the invasive agricultural pest *D. suzukii**
Awarded the ISCE Student Travel bursary and best oral presentation
- 2017** Poster presentation at the 3rd Agriscience Chemical Biology Postgraduate Symposium, UK
*Host fruit selection by the olfactory system in the invasive agricultural pest *D. suzukii**
Awarded runner up poster price
- 2016-2018** 3-minute-oral and poster presentations to a multidisciplinary audience at the annual conferences of the SWBioDTP training program, UK
Watch the 3-minute-talk at: <https://youtu.be/0kXNXERMclQ>
- 2012, 2014** Poster presentations at the annual meeting of the Netherlands Society for Behavioural Biology (NVG), Soesterberg, The Netherlands
- 2013** Oral presentation at the first national meeting of the French association of young researchers in Chemical Ecology AFJCEC, Montpellier, France

Duménil C., Spitaler U, Rehmann G, Bianchi F, Favaro R, Castellan I, Eisenstecken D, Schmidt S, Becher PG, Angeli S. Yeast-based attract-and-kill strategies for *Drosophila suzukii* management without disrupting honey bee activity. **PLoS One** **2025**, 20(5): e0323653. DOI: 10.1371/journal.pone.0323653

Duménil C., Yildirim G., Haase A. Differential coding of fruit, leaf, and microbial odours in the brains of *Drosophila suzukii* and *Drosophila melanogaster*. **Insects** **2025**, 16, 84. DOI: 10.3390/insects16010084

Castellan I, **Duménil C.**, Rehmann G, Eisenstecken D, Bianchi F, Robatscher P, Spitaler U, Favaro R, Schmidt S, Becher PG, Angeli S. Chemical and electrophysiological characterisation of headspace volatiles from yeasts attractive to *Drosophila suzukii*. **Journal of Chemical Ecology** **2024**. DOI: 10.1007/s10886-024-01494-x

Spitaler, U., Cossu, C.S., Delle Donne, L., Bianchi, F., Rehmann, G., Eisenstecken, D., Castellan, I., **Duménil, C.**, Angeli, S., Robatscher, P., Becher, P.G., Koschier, E.H. and Schmidt, S. Field and greenhouse application of an attract-and-kill formulation based on the yeast *Hanseniaspora uvarum* and the insecticide spinosad to control *Drosophila suzukii* in grapes. **Pest Management Science** **2022**. DOI: 10.1002/ps.6748

Sims C., Oddy J., Hibbert L. E., Newell A. S., Steel L. R., Gibbons A.T., Caporaso N., **Duménil C.**, Read S., Margerison R. C.P. Feeding the future: developing the skills landscape in the agri-food sector. **Journal of Chemical Technology & Biotechnology** **2021**. DOI: 10.1002/jctb.6844

Bianchi F., Spitaler U., Castellan, I., Cossu C.S., Brigadoi T., **Duménil C.**, Angeli S., Robatscher P., Vogel R.F., Schmidt S., Eisenstecken D. Persistence of a yeast-based attract-and-kill formulation against *Drosophila suzukii* on grape leaves. **Insects** **2020**. DOI:10.3390/insects11110810

Deletre E., Martin T., **Duménil C.**, Chandre F. Insecticide resistance modifies mosquito response to DEET and natural repellents. **Parasites & Vectors** **2019**. DOI:10.1186/s13071-019-3343-9

Duménil C., Woud D., Pinto F., Alkema J.T., Jansen I., Geest A.M., Roessingh S., Billeter J.C. Pheromonal cues deposited by mated females convey social information about egg-laying sites in *Drosophila melanogaster*. **Journal of Chemical Ecology** **2016**. DOI: 10.1007/s10886-016-0681-3

Deletre E., Chandre F., Williams L., **Duménil C.**, Menut C., Martin T. Electrophysiological and behavioral characterization of bioactive compounds of the *Thymus vulgaris*, *Cymbopogon winterianus*, *Cuminum cyminum* and *Cinnamomum zeylanicum* essential oils against *Anopheles gambiae* and prospects for their use as bednet treatments. **Parasites & Vectors** **2015**. DOI: 10.1186/s13071-015-0934-y

Duménil C., Judd G.J.R., Bosch D., Baldessari M., Gemeno C., Groot A.T. Intraspecific variation in female sex pheromone of the codling moth *Cydia pomonella*. **Insects** **2014**. DOI:10.3390/insects5040705