Current position May 2024- April 2025

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

Dr S. Angeli, university of Bolzano, Italy

I am currently working along side collaborators Dr Luca Cappellin (University of Padova) and Dr Diana di Gioia (University of Bologna) to determine how microorganisms from the soil affect pollinators attraction to sunflowers. My responsibilities involve the coordination of organic volatile compounds collection in field and laboratory, observation of pollinators in field, electrophysiological recordings in honeybees.

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

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

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

Awarded funding for this project. I co-designed and planned the study. Organised administrative and logistics to get transgenic Drosophila flies. I mastered dissection, immunostaining and 2-photon microscopy, Image processing with segmentation and 3D reconstruction. I revealed significant odour coding patterns in the Drosophila antennal lobe and differences between Drosophila species that appear linked to evolutionary events. Odour coding information will help develop chemosensory management tools. I co-created international collaborations to develop projects with genetic engineering and machine learning in the service of integrated pest management. I supervised Msc students, participated in outreach events, presented at international conferences. Manuscript published.

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

Dr S. Angeli, university of Bolzano, Italy

I identified antennally active volatiles from yeasts and plants using EAG and GC-MS, collected and analysed plant volatiles. I discussed and wrote results in 4 publications (1 in preparation) with partners. I secured two international conference talks. Collaborative project with Dr S. Schmidt and Dr D. Eisenstecken, Laimburg Research centre (Italy) and Dr 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 in preparation.

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

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

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

I led this collaborative project between Cardiff University and Rothamsted Research . I co-designed and planned the study. I mastered electrophysiology and volatile collection and analysis. I performed data acquisition and processing, designed statistical analysis, wrote, discussed and presented the results . I demonstrated how the peripheral olfactory system encode complex odours from fruits in the flies *D. suzukii* and *D. melanogaster* . I identified the subsets of olfactory neurons activated by fruit volatiles and subsequently identified bioactive chemicals that are potential tools for field management. I presented my work at several meetings and was awarded for presentation skills. 3 manuscripts are in preparation.

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

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

I co-designed behavioural experiments with odourless and anosmic flies obtained from transgenic crosses. Learned Drosophila molecular techniques, designed the statistical analysis of data. I mentored 2 Bsc and 1 Msc student with data collection. I found an odour guided preference in food choice which diverged with mating status. Presented and published the results.

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

Dr A. T. Groot, University of Amsterdam, NL

I co-designed and co-led the project, including field collection, coordination with collaborators and troubleshooting. I collected, analysed the data. I identified variation in sex pheromone composition across populations from different management methods in Dutch, Spanish and Canadian apple orchards. We published the results.

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

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

I performed behavioural work using WHO-certified methods on an ongoing research. 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. Results are published.

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

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

I planned, coordinated the logistics, troubleshot and performed experiments using transgenic plants, and analysed the data. 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.

Teaching experience

2024-2025 Teacher assistant in Msc and Bsc practicals

Co-designed and co-led the practicals, including chemical ecology, insect manipulation, dissection and fieldtrips

Prof. S. Angeli

2012-2023 Assistant supervision of Bsc and Msc projects

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

Dr Albrecht Haase, University of Trento, Italy

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

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

Dr A. T. 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

Other 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

I shared valuable insights with researchers and growers regarding the pest *D. 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 them.

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 Oxylane 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)

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

Funding 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

PhD project: Encoding of fruit odours by the peripheral olfactory system in *Drosophila suzukii*

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

- Microsoft Office and Apache Open Office suites
- Data processing softwares: Agilent and Syntech suites, Fiji, Inscape, GraphPad
- R, Matlab, Python, HTML and JavaScript (beginner proficiency)

Laboratory

- Electrophysiology: Single sensillum recording, electroantennography
- Chemistry: Identification of chemicals with gas chromatography, mass spectrometry;
  Collection of chemicals from plants and insects in laboratory and field;
  Chemical handling, dilution, quality assessment
- Entomology: Behavioural experimentation in laboratory with moths, flies and mosquitoes;
  Moth and fly rearing (including transgenic Drosophila lines);
  Handling of live insects for fine mounting and micro-dissection
- Molecular biology: PCR, design of primers, crosses of transgenic flies
- Imaging techniques: Functional and structural in-vivo 2-photon microscopy, fluorescence microscopy

Other practical and interpersonal skills acquired through workshops and experience

- Laboratory and office protection, first aid intervention, emergency reactions
- Mental health awareness and stress management
- Ethics, data protection, inclusion, equality, unconscious bias
- Communication: team work, conflict management, mentoring
- Science communication, vulgarisation, outreach
- European car driving licence

Communication and outreach

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/0kXNXERMcIQ

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

Publications open access via https://orcid.org/0000-0002-8339-5540

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**, Rehermann G, Eisenstecken D, Bianchi F, Robatscher P, Spitaler U, Favaro R, Schmidt S, Becher PG, Angeli S. Chemical and electrophysiologicalcCharacterisation 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., Rehermann, 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