

Curriculum Vitae

Personal Details	
Full Name and Title Dr. Angela Meccariello	
CID 00974059	
Address Department of Life Sciences (DoLS) Imperial College London Flowers Building South Kensington Campus London SW7 2AZ	Mobile: +447594846515 E-Mail: a.meccariello@imperial.ac.uk
Present Occupation Assistant Professor at the Department of Life Sciences (DoLS), Imperial College London, South Kensington Campus, London SW7 2AZ, UK. <u>Fields of research</u> • Development of efficient genetic approaches of pest control that have the potential for transferability to other agriculture species using medfly as model insect. (Sex ratio distorters, gene drive) • Evolutionary studies of sex determination genes in insects.	
Educational experience 2014-2017: Ph.D. Course in Biology – 29th cycle - (Label “Doctor Europaeus”) University of Naples 'Federico II'. (Supervisor: Prof. Giuseppe Saccone) 2011-2013: M. Phil. Degree , University of Naples 'Federico II', Applied Biology (magna cum laude) Relevant Coursework: Molecular biology, Genetics, Biochemistry 2006-2010: B.S. Biological Sciences , University of Naples 'Federico II'.	
Career Breaks Maternity Leave: 25 October 2022 – 10 September 2023; 23 October 2024 – 28 April 2025.	

Positions

Since Jul 2024:	Assistant Professor, DoLS, Imperial
2023-2024:	Proleptic Lecturer, DoLS, Imperial College London
2020- 2024:	Imperial College Research Fellow (ICRF2020), DoLS, Imperial college London. Development of sex ratio distorters to control the major agricultural insect pest <i>Ceratitis capitata</i>
2017-2019:	Research Associate, DoLS, Imperial College London. (Windbichler lab)
Jul – Oct 2017:	Research Associate, University of Perugia. (Papathanos lab)
2014-2017:	Ph.D. Course in Biology – 29th cycle - (Label “Doctor Europaeus”) University of Naples 'Federico II'. “Genomics, transcriptomics and CRISPR/CAS gene editing approaches to investigate embryonic sex determination in insect pest <i>Ceratitis capitata</i> .” (Supervisor: Prof. Giuseppe Saccone)
Oct – Nov 2015	Ph.D. student host, University of Zurich, “Study on Sex Determination and CRISPR/CAS9 in <i>Musca domestica</i> and <i>Ceratitis capitata</i> .”
August 2015	The IGTRCN short course: Insect Genetic Technologies: Theory and Practice. Institute for Bioscience and Biotechnology Research University of Maryland (USA).
Apr– Jun 2015	Ph.D. student host, University of Zurich, “Study on Sex Determination in <i>Musca domestica</i> and <i>Ceratitis capitata</i> .”

Coordinator or participant in scientific research projects

2026-2027:	Coordinator USDA (agreement: 26-8130-1007-CA-Year 4) Topic: Development of Precision Guided SIT (pgSIT) In Tephritids
2025-2029:	Coordinator USDA (agreement: 26-8130-1164-CA) Topic: Develop Mexfly control strategy
2022-2026:	Coordinator WP 4. HORIZON- RIA-CL6- 2021-REACT: SEP- 210764180 Topic: Rapid elimination of invasive agricultural insect pest outbreaks by tackling them with Sterile Insect Techniques programs
2024-2025:	Coordinator USDA (agreement: 26-8130-1007-CA- Year 3) Topic: Development of Precision Guided SIT (pgSIT) In Tephritids
2023-2024:	Coordinator USDA (agreement: 23-8130-1007-CA- Year 2) Topic: Development of Precision Guided SIT (pgSIT) In Tephritids
2022-2023:	Coordinator USDA (agreement: 22-8130-1007-IA-Year 1) Topic: Development of Precision Guided SIT (pgSIT) In Tephritids
2021-2024:	Co-Coordinator. BBSRC Responsive Mode (BB/W00304X/1) Topic: Driving sex conversion for the genetic control of agricultural pests
2020-2024:	ICRF2020. Topic: Development of sex ratio distorters to control the major agricultural insect pest <i>Ceratitis capitata</i>

Key achievements & Awards

- I identified a gene, that we have called *Maleness on the Y (MoY)*. *MoY* is the master male- determining gene in Tephritidae. This discovery has a tremendous potential for insect genetic control based on mass release of sterile males and for future strategies based on gene drive.
- I am the pioneer of the application of CRISPR/Cas9, an innovative technique of gene editing that allows to induce heritable mutations in specific genes in the *Tephritidae* species
- Successfully led and executed the application process with APHA and DEFRA, securing a key government licence for the import and export of *Ceratitis capitata* and *Anastrepha*

ludens in England. Additionally, I obtained the necessary institutional permits from Imperial College London to initiate the *Ceratitidis capitata* and *Anastrepha ludens* research project.

- I established the insect rearing facility for *Ceratitidis capitata* and *Anastrepha ludens* in collaboration with Emma Sharp (Project Manager, Faculty of Natural Sciences), Dr. Emma Edwards (Senior Laboratory Technician, Life Sciences), Allison Hunter (Technical Operations Manager, Life Sciences), and Stefan Hoyle (Head of Health & Safety).
- Generated the first male-biased strain of transgenic *Ceratitidis capitata* for pest control
- My work on genetic approaches for pest control allowed the securing of the BBSRC grant and attracted funding for Imperial and international recognition by relevant scientific consortia (Insect Pest Control Section | Joint FAO/IAEA)
- Awarded the Imperial College Research Fellowship (ICRF20) in July 2020
- My work on genetic approaches for pest control led to securing funding from the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ).
- Awarded the Horizon Europe Connect Fund to establish a new European consortium. The SPACE project will define a species-agnostic pipeline spanning risk forecasting and diagnostics to sustainable interventions and decision support. These funds are supporting the organisation of a three-day workshop (2–4 June 2026) at Imperial College London to coordinate the new European consortium.
- First woman appointed as Principal Investigator within the new Coordinated Research Programme (CRP 2026-2031): *Advanced Approaches for the Development of Genetic Sexing Strains for Sterile Insect Technique Applications*, under IAEA Research Agreement No. 29462.
- Submitted international patent application (PCT/US2025/061221), filed on 23 December 2025: Method for Sex-Sorting Insects.
- Established a strategic agreement with Agragene Inc. (US-based).
- Lead a co-funded PhD scholarship between the Department of Life Sciences (DoLS) and Agragene Inc., strengthening academia-industry collaboration and advancing translational research in agricultural pest management.

Expertise

Research & Management

- Experience in managing the day-to-day activities of research labs
- Ability to work within multi-disciplinary teams including structural and theoretical biologists
- International collaborations include academic (e.g., University of California, San Diego, Hebrew University, Israel, USDA, FAO-IAEA)
- European collaborations within the REACT project, fostering cross-institutional partnerships and advancing coordinated research initiatives.
- Established and maintained industrial collaborations with Synvect and Agragene, advancing applied research and fostering academia–industry knowledge exchange in agricultural biotechnology.

Teaching & Outreach

- Extensive experience supervising research associates, laboratory technicians, final-year undergraduate (FYP) students, and MRes rotation students, providing mentorship, technical training, and academic guidance.
- Day-to-day supervision of PhD student
- I am acting as host supervisor for a PhD student from Ghana under Imperial's Global Development Fellowship (March–July 2026). This four-month placement focus on advanced laboratory training, research collaboration, and capacity building within an LMIC context.
- Long-standing experience in teaching biology students in seminars and lectures in English and Italian on topics such as Mendelian genetics, Sex determination, and genetic pest control
- I started acting as a Department of Life Sciences undergraduate biology Personal Tutor
- Judge, Faculty Research Showcase, FoNS Showcase - posters and short videos to evaluate
- I regularly work with the media in the UK, to promote my research in interviews and articles. This reflects not only my desire to communicate my passion for Science but also the elevated public scrutiny that projects related to genetic engineering have to address • I have been lecturing at Imperial in a MSc ABB; Insect Biotechnology (Convenor: Dr. Nikolai Windbichler) and one final year course (Biology, ecology and environmental biology, microbiology, plant biology and zoology course units; Advanced Topics in Parasitology and Vector Biology, Convenor Prof. Andrea Crisanti, L27 Sexual Development in Insect Vectors).

Consultancy & Organization

- Served on PhD recruitment panels within the Department of Life Sciences (DoLS), assessing research potential and alignment with departmental strategy.
- Appointed Co-Lead (invited) of the Evolutionary Biology Research Theme, contributing to the strategic redesign of research themes, development of cross-campus community initiatives (EvoBio seminars and workshops), and shaping the theme's external communication and visibility.
- Member of the Research and Fellowship Committee (DoLS), contributing to departmental research strategy and the internal review of grant and fellowship applications.
- Reviewed grant proposals for BBSRC (UK), Domain Science M (Netherlands), and PRIN – Research Projects of National Relevance (Italy).
- Since 2020, served on the Research and Grants Committee in the Department of Life Sciences (Imperial College London), acting as a peer reviewer for new research strategies and fellowship applications.
- Acted as a referee for a number of leading biological and multidisciplinary journals (e.g., Nature Communications, Science Advance, Elsevier: Journal of Insect Physiology, Mdpi: International Journal of Molecular Sciences, Applied Insect Reproductive Biology, Insects)
- Provided consultancy for Biotech companies in the UK (Beta Bugs Limited) and USbase company Agragene

- Experience in organizing international scientific conference (Mini SYMPOSIUM organizer at the JOINT MEETING AGI – SIMAG 26-28 September 2019, Cortona, Arezzo, Italy).

Representative publications

* Indicates that the applicant is corresponding author of the paper

^ Indicates that the applicant is co-first author of the paper

1. Davydova, S. & Liu, J., Kandul, N. P., Antoshechkin, I., Mann, J., Braswell, W. E., Akbari, O. S. & **Meccariello, A***. (2026) Generating cisgenic sexing strains in insect pests. *Communications Biology*. <https://doi.org/10.1038/s42003-026-09624-9>
2. Davydova, S., Liu, J., Liu, Y., Prince, K., Mann, J., Kandul, N.P., Braswell, W.E., Champer, J., Akbari, O.S. & **Meccariello, A***. (2025) A self-limiting sterile insect technique alternative for *Ceratitis capitata*. *BMC Biology*. 23 97 <https://doi.org/10.1186/s12915-025-02201-2>
3. Davydova, S., Yu, D. & **Meccariello, A***. (2025) Genetic engineering for SIT application: a fruit fly-focused review. *Insect Science*. <https://doi.org/10.1111/1744-7917.70038>
4. Davydova, S. & **Meccariello, A***. (2025) Engineering New CRISPR-Mediated Population Control for Tephritid Pests, *Current Opinions in Insect Science*. <https://doi.org/10.1016/j.cois.2025.101415>
5. **Meccariello, A*** et al. Suppressive gene drive to control the global agricultural pest *Ceratitis capitata*. *Nature communication* (2024) <https://doi.org/10.1038/s41467-023-44399-1>
6. Davydova, S. & Liu, J., Kandul, N. P., Braswell, W. E., Akbari, O. S. & **Meccariello, A***. (2023) Next-generation genetic sexing strain establishment in the agricultural pest *Ceratitis capitata*. *Scientific Reports*. 13 (1), 19866. <https://doi.org/10.1038/s41598-023-47276-5>
7. **Meccariello, A.**, Krsticevic, F., Colonna, R. et al. Engineered sex ratio distortion by X-shredding in the global agricultural pest *Ceratitis capitata*. *BMC Biol* (2021); 19, 78. <https://doi.org/10.1186/s12915-021-01010-7>.
8. Primo, P.^, **Meccariello, A.**^, Inghilterra, M.G. et al. Targeting the autosomal *Ceratitis capitata* transformer gene using Cas9 or dCas9 to masculinize XX individuals without inducing mutations. *BMC Genet* (2020); 21, 150. <https://doi.org/10.1186/s12863-020-00941-4>.
9. **Meccariello, A.**, Tsoumani, KT, Gravina, A, et al. Targeted somatic mutagenesis through CRISPR/Cas9 ribonucleoprotein complexes in the olive fruit fly, *Bactrocera oleae*. *Arch Insect Biochem Physiol*. (2020); 104:e21667. <https://doi.org/10.1002/arch.21667>.
10. Fasulo B, **Meccariello A**, Morgan M, Borufka C, Papathanos PA, et al. A fly model establishes distinct mechanisms for synthetic CRISPR/Cas9 sex distorters. *PLOS Genetics* (2020) 16(3): e1008647. <https://doi.org/10.1371/journal.pgen.1008647>.
11. **Meccariello A**, et al. *Maleness-on-the-Y (MoY)* orchestrates male sex determination in major agricultural fruit fly pests. *Science* (2019); 365 (6460), 1457-1460.
12. Tsoumani, KT, **Meccariello, A**, Mathiopoulos, KD, Papathanos, PA. Developing CRISPRbased sex-ratio distorters for the genetic control of fruit fly pests: A how to manual. *Arch. Insect Biochem. Physiol*. (2020); 103:e21652. <https://doi.org/10.1002/arch.21652>.
13. **Meccariello, A.**, Monti, S., Romanelli, A. et al. Highly efficient DNA-free gene disruption in the agricultural pest *Ceratitis capitata* by CRISPR-Cas9 ribonucleoprotein complexes. *Sci Rep* (2017); 7, 10061. <https://doi.org/10.1038/s41598-017-10347-5>
14. Heinze, S.D., Kohlbrenner, T., Ippolito, D. et al. CRISPR-Cas9 targeted disruption of the *yellow* ortholog in the housefly identifies the brown body locus. *Sci Rep* (2017); 7, 4582. <https://doi.org/10.1038/s41598-017-04686-6>.
15. Papanicolaou A., Schetelig M.F., et al. The whole genome sequence of the Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann), reveals insights into the biology and adaptive evolution of a highly invasive pest species. *Genome Biol*. (2016); Sep 22;17(1):192

Invited Presentations & Talks at International Conferences

Networking and Collaboration

- **Contributed to the REACT Annual Meeting** (Parma, Italy, September 2025), presenting research progress and supporting consortium coordination and future funding strategy.
- **Webinar:** “Bioethics of genome editing” organized by Prof. Barbara Majello. Scientific dissemination events for high school, University of Naples. Topic: CRISPR-Cas9-*Ceratitidis capitata* genome editing, Mediterranean fly (March 2025)
- **Scientific seminar for PhD students** of the Department of Biology of the University of Naples organized by Prof. Giuseppe Saccone. Topic: “Crispr/Cas9 to control invasive agricultural insect pest” (Jun 2024)
- **Contributed to the REACT Project Kick-Off Meeting** (Germany, January 2023), supporting the coordination of European research activities and consortium planning.
- **FAO/IAEA:** Second Research Coordination Meeting on Generic Approach for the Development of Genetic Sexing Strains for SIT Applications in Vienna, Austria. (18-22 October 2021 <https://www-pub.iaea.org/MTCD/Publications/PDF/Newsletters/ipc-98.pdf>)
- Invited as speaker at the University of East Anglia- **BIO Open Lecture:** Making males: CRISPR/Cas9 as a tool to edit sex determination genes in the insect pest *Ceratitidis capitata* to control its population. (Nov 3, 2021)

Conferences

- Invite as speaker at Entomology 2025. Portland, Oregon, US. November 9-12, 2025
- Invite as speaker at Gordon Research Conference: Enhancing Public Health, Food Security and Biodiversity. Barcelona, Spain. May 19 - 24, 2024
- Invited as speaker at Nöthiger meeting EvoSexDevo CAPRI 2024 (April 2-5-2024)
- Invited as speaker at Nothiger meeting EvoSexDevo (30 March - 2 April 2022)
- Invited as speaker at Gordon Research Conference: Genetic Biocontrol, short Early Investigator presentation in Session 6 - Manipulating Sex Determination to Affect Genetic Biocontrol (June 26 – July 1, 2022, California, USA)