Summary of Professional Accomplishments

1. **Name**

   dr Gema Trigos Peral

2. **Diplomas, degrees conferred in specific areas of science or arts, including the name of the institution which conferred the degree, year of degree conferment, title of the PhD dissertation**

- 20 October 2015. PhD in Biology, Faculty of Sciences, University of Cordoba, Spain. Title of PhD thesis: “Papel de las zonas urbanas en las estrategias globales de conservación usando hormigas como bioindicadores” [“Role of urban green spaces in global strategies of conservation using ants as bioindicators”]

- 8 October 2010. Diploma de Estudios Avanzados (DEA) [Equivalent of postgraduate studies]. Faculty of Sciences, University of Cordoba, Spain. Title of the Master research thesis: “Primera relación de los formícidos (Hym., Formicidae) de Reserva Natural Lagunas de Campillos (Málaga)” ["First report of the ants (Hym., Formicidae) from the Lagunas de Campillos Natural Reserve (Málaga)"]

- 21 November 2008. Certificado de Aptitud Pedagogica (CAP) [Equivalent to Teaching Aptitud Certificate]. University of Granada, Spain.

- 10 January 2008. Licensed degree in Biology [Master’s degree in Biology]. Faculty of Sciences, University of Cordoba, Spain.

3. **Information on employment in research institutes or faculties/departments or school of arts**

Current position

Position	Assistant Professor		
Initial date	29/06/2018		
Institution	Museum and Institute of Zoology (Polish Academy of Sciences)		
Department/Center	Department of Social and Myrmecophilous Insects		
Country	Poland	Phone number	(+48) 730 37 58 58
Key words	myrmecology, urbanization, behaviour, nutritional ecology, evolutionary ecology		

Previous professional status (including breaks in research career, according to what is indicated in the call, indicate total months)

Period	Position/Institution/Country/Interruption cause
30/06/2015-28/06/2018	Specialist / Museum and Institute of Zoology (PAS)/ Poland
01/07/2014-29/06/2015	Biologist / Museum and Institute of Zoology (PAS)/ Poland
11/2009 – 12/2013	PhD student / Faculty of Sciences / University of Cordoba / Spain

4. Description of the achievements, set out in art. 219 para 1 point 2 of the Act

4.1. A series of four scientific articles published in 2020–2024, which constitute my achievement entitled "Abiotic and biotic stressors shaping ant communities in urban habitats".

The total number of points for the articles constituting my scientific achievement is as follows: **MNiSW = 440 points, IF = 18.611** (calculations based on Web of Science; see Annex IV). The first publication resulted from a study partially funded by the *Gwiazda 2015* internal grant awarded by the Polish Academy of Sciences. The second publication stems from my research stay at the Doñana Biological Station in Seville, Spain, in 2020 (see Section 5.1). Publications 3 and 4 are outcomes of projects funded by the National Science Centre (*Miniatura 3*, grant no. 2019/03/X/NZ8/0177) and the Polish National Agency for Academic Exchange (NAWA, grant no. PPN/BDE/2020/1/00016), in both of which I served as the Principal Investigator (PI). The NAWA project was carried out as part of an international collaboration between myrmecologists from the Museum and Institute of Zoology (Polish Academy of Sciences) in Warsaw and the University of Regensburg in Germany.

Publications included in the thematic cycle of the scientific achievement:

1. **Trigos-Peral G.**, Rutkowski T., Witek M., Ślipiński P., Babik H., Czechowski W. 2020. Three categories of urban green areas and the effect of their different management on the communities of ants, spiders and harvestmen. *Urban ecosystems* 23: 803 – 818. https://doi.org/10.1007/s11252-020-00949-9 [IF_{2020}: **3.005;** MEiN: **70 points**].

   I declare that my contribution to the above article included conceptualization of the main research hypotheses, funding acquisition, planning the methodology and collecting data in the field and the laboratory with the support from my colleagues. Besides, I carried out the administrative tasks, analysed data, and prepared the first version of the manuscript which then I consulted with the co-authors.

2. **Trigos-Peral G.**, Abril S., Angulo E. 2021. Behavioral responses to numerical differences when two invasive ants meet: the case of *Lasius neglectus* and *Linepithema humile*. *Biological Invasions* 23: 935–953. https://doi.org/10.1007/s10530-020-02412-4 [IF_{2021}: **3.606;** MEiN: **100 points**].

   I declare that my contribution to the above article included conceptualization of the main research hypotheses, funding acquisition, planning the methodology and collecting data in the field and the laboratory with the support from my colleagues. Besides, I carried out the administrative tasks, analysed data, and prepared the first version of the manuscript which then I consulted with the co-authors.

3. **Trigos-Peral G.**, Maák I., Schmid S., Chodzik P., Czaczkes TJ., Witek M., Casacci LP., Sánchez-Garcia D., Lörincz A., Kochanowski M., Heinze J. 2024a. Urban abiotic stressors drive changes in the foraging activity and colony growth of the black garden ant *Lasius niger*. *Science of The Total Environment* 915: 170157 https://doi.org/10.1016/j.scitotenv .2024.170157 [IF_{2023}: **8.2;** MEiN: **200 points**].

   I declare that my contribution to the above article included conceptualization of the main research hypotheses, funding acquisition, planning the methodology and collecting data in the field and the laboratory with the support from my colleagues. Besides, I carried out the project administration, analysed data, and prepared the first version of the manuscript which then I consulted with the co-authors.

4. **Trigos-Peral G.,** Witek M., Csata E., Chudzik P., Heinze J. 2024b. Urban diet as potential cause of low body fat content in female ant sexuals. *Myrmecological News* 34: 181-190. https://doi.org/10.25849/myrmecol.news_034:181 [IF_{2023}: **3.8**; MEiN: **70 points**].

   I declare that my contribution to the above article included conceptualization of the main research hypotheses, funding acquisition, planning the methodology and collecting data in the field and the laboratory with the support from my colleagues. Besides, I carried out the project administration, analysed data, and prepared the first version of the manuscript which then I consulted with the co-authors.

The statements of all co-authors of the above-mentioned publications regarding their contributions can be found in the Annex I.

4.1.1. Introduction

Urban ecosystems have become a focal point of ecological studies, gaining research interest in the early 20th century when sociologist Robert E. Park published his pioneering work on human behavioural changes in cities (Park 1915). A few decades later, in the 1970s, urban ecology emerged as a sub-discipline of ecology, though it did not attract significant interest among researchers until the 1990s. Since then, the discipline has grown in importance due to the multiple impacts of human settlements and activities on ecosystems and organism

interactions (McDonnell 2011). For instance, the published research has shown that urbanization brings about changes at multiple levels. While alterations in the landscape's structure and composition are easily visible after a city is built, more subtle changes related to environmental features, nutritional availability, and species interactions also occur. These cryptic changes significantly influence urban biotic communities and threaten the balance of this artificial ecosystem, contributing to the current global biodiversity crisis (Schickhoff et al. 2024).

Despite the increasing number of urban ecological studies investigating the impact of urbanization on life history traits of biodiversity. However, these studies are often biased towards vertebrates, especially mammals and birds (Aronson et al. 2023), whereas invertebrates (including ecological key groups like ants) remain understudied despite their crucial functions in ecosystems (Hölldobler & Wilson 1990, Matilda et al. 2024). It According to Web of Science, almost a century of urban myrmecological research has produced nearly 300 publications. However, most of these focus on the impact of landscape structure on ant community composition, while the influence of many other pressuring factors, like urban temperatures or light pollution, remains poorly understood. Indeed, although currently Night Warming (NW) and Artificial Light At Night (ALAN) are considered among the strongest habitat alterations, one of the publications included in this scientific achievement the first contribution investigating their impact on ant foraging and colony development (Trigos-Peral et al. 2024a). Additionally, despite the key role of nutrition in organism functioning, little is still known about potential shifts in nutritional resources available for ants between rural and urban environments (Penick et al. 2016) and its impact on ant populations. Also in this matter, my research has been the first contribution revealing potential impact of the urban diets on ant colonies production (Trigos-Peral et al. 2024b).

In my main research achievement, I used the bioindicator role of ants (Trigos-Peral & Reyes-López, 2025) to evaluate the impact of urbanization on ant communities from different perspectives, aiming to understand how these communities are affected, with potential applications of the results to other animal groups. To that end, I studied urban pressures by assessing both abiotic and biotic factors, including environmental and nutritional changes, as well as biological invasions. I first evaluated the impact of the type of management in urban greeneries on ant communities in Warsaw (Article 1, Trigos-Peral et al. 2020). Previous studies have been published about the Warsaw myrmecofauna (Czechowski et al. 1982, 1990, Czechowski & Pisarski 1990, Czechowski 1991, Ślipiński et al. 2012, among others), constituting the basis for the here presented more exhaustive analyses of the urban pressures.

My research also analysed the co-existence of invasive species in urban areas. Despite numerous studies reporting the presence of different invasive ant species in a same urban area, little is known about the mechanisms leading to their co-existence (Article 2, Trigos-Peral et al. 2021). Finally, my research has been pioneering in studying how NW and ALAN facilitate nocturnal foraging activity in urban environments—potentially benefiting synanthropic species—as well as how shifts in nutritional resources between rural and urban areas influence ant colony productivity (Articles 3, 4:Trigos-Peral et al. 2024a, b.). Although these phenomena have been studied in other animal groups (e.g., Szulkin 2020, Sanders et al. 2021, Anders et al. 2022, Derryberry & Coomes 2020), they are poorly understood in insects and

rarely studied in ants (Tougeron and Sanders 2023).

4.1.2. Results

1. **Trigos-Peral G.**, Rutkowski T., Witek M., Ślipiński P., Babik H., Czechowski W. 2020. Three categories of urban green areas and the effect of their different management on the communities of ants, spiders and harvestmen. *Urban ecosystems* 23: 803 – 818. https://doi.org/10.1007/s11252-020-00949-9.

   The aim of this study was to determine whether different types of management of urban greeneries within the same city can lead to different ant community compositions. This study serves as an estimate of how the intensity of land change can threaten native local biodiversity and how different management practices can be used for conservation purposes. For this study, I collaborated with Prof. Wojciech Czechowski, the foremost expert in Polish ant myrmecofauna and the author of the first urban studies in Warsaw.

   Since the beginning of my interest in myrmecology, I have studied and read about the structure and composition of ant communities across various habitat types (Trigos-Peral 2015, PhD thesis). However, in all these studies, comparisons were made among different locations influenced by varying surroundings. This time, I was curious whether different habitat types, all within the city of Warsaw and influenced by the same surroundings, could host different ant communities. Additionally, I wanted to explore whether the nature of these habitats, in terms of vegetation diversity and similarity to natural habitats, would determine the ant species inhabiting them.

   This study analyses the importance of the habitat characteristics and management for conservation purposes. This study investigates differences in community composition of ants, spiders and harvestmen among three types of urban greeneries with different management: botanical gardens – habitats with high plant species richness and intensive maintenance –, urban parks – habitats with low plant diversity, characterized by extensive lawns maintained through regular mowing and the removal of grass, leaf litter, and fallen branches– and urban woodlands – remnants of old forests or green areas dominated by forest vegetation, with little to no maintenance and a composition similar to natural wooded areas outside the city. This study compares the biodiversity of ants, spiders, and harvestmen across the three habitat types and analyses the impact of management on these groups based on species' ecology and functional groups. The results reveal that both botanical gardens and urban woodlands play a crucial role in conserving native biodiversity. They host richer communities (in terms of species composition) and a greater diversity of specialist species—those that are highly endangered in urban areas due to their specific ecological requirements—than urban parks. Moreover, the invasive garden ant *Lasius neglectus* was found only in urban parks, suggesting that this type of management is particularly susceptible to biological invasions, which pose a major threat to native arthropod fauna.

   This study reveals a variety of hypotheses that might explain the dominance of some species, like the ant *Lasius niger*, in urban greeneries, the lack of invasive species in natural habitats,

or the different responses among native species to the presence of invasive species.

2. **Trigos-Peral G.**, Abril S., Angulo E. 2021. Behavioral responses to numerical differences when two invasive ants meet: the case of *Lasius neglectus* and *Linepithema humile*. *Biological Invasions* 23: 935–953. https://doi.org/10.1007/s10530-020-02412-4.

   The aim of this study was to determine the behavioural mechanisms that allow the co-existence of two the most invasive ant species in European urban areas. For this study, I collaborated with two renowned experts in ecology, behaviour and impact of the Argentine ant (*Linepithema humile*) from Spain: Dr. Elena Angulo (Biological Station of Doñana – CSIC, Seville) and Dr. Sílvia Abril (University of Girona, Girona).

   Since I started my collaboration at the University of Cordoba (Spain), I observed the presence of various alien and invasive species occurring together in urban areas (Trigos-Peral & Reyes-López 2016b, 2020d); however, this situation was not observed in natural ones. Despite the invasive species are highly aggressive, they are capable of co-occurring in the same territory and with reduced aggressive interactions. Indeed, this scenario can be observed in different locations in Spain likeSant Cugat del Vallés (Barcelona), where some of colonies used in this study were collected, or in Torre del Mar (Malaga), where invasive ant *L. humile* shares the promenade with other invasive species like *Pheidole teneriffana*, *Paratrechina longicornis* and *Nylanderia jaegerskioeldi*.

   Human-disturbed areas, including cities, provide ideal habitats for the arrival and establishment of alien and invasive ant species (Trigos-Peral & Reyes-López, 2016d). In general, such invasions lead to the displacement of native species due to the numerical and behavioral dominance of invasive ants. However, the observed co-occurrence of multiple invasive species suggests the presence of behavioural adaptations that allow for their coexistence.

   This study aimed to test whether numerical differences during confrontations between the two main invasive ant species in Europe—*Linepithema humile* and *Lasius neglectus*—could eventually lead to the displacement of one species, or whether long-term co-occurrence is possible due to their behavioural plasticity. The results showed that both species are capable of modulating their competitive strategies based on numerical dominance, prior experience, and species-specific behavioural tendencies. During confrontations, *L. neglectus* exhibited a more aggressive response when it was numerically inferior, while *L. humile* appeared more successful when it held numerical superiority. Despite their inherent interspecific competitiveness, the study revealed reduced aggression during interactions between co-occurring populations. These populations employed either a “dear enemy” strategy (minimizing interactions) or a “bourgeois strategy” (territory monopolization when dominant), depending on the context. This study shows that urban environments create new challenges for native ant communities, particularly through the simultaneous establishment of multiple invasive species. Furthermore, it provides the first evidence of behavioural plasticity in invasive ants during competitive encounters—an additional trait contributing to their successful colonization of invaded areas.

Moreover, this study highlights the importance of numerical dominance in the successful establishment of invasive species and raises the question of whether urban characteristics that threaten native species—such as elevated temperatures, light pollution, or habitat homogenization—might actually benefit invasive species due to their remarkable ecological plasticity, thereby allowing them to achieve advantageous numerical dominance. These hypotheses have been tested in the following studies included in my main research achievement.

3. **Trigos-Peral G.**, Maák I., Schmid S., Chodzik P., Czaczkes TJ., Witek M., Casacci LP., Sánchez-Garcia D., Lörincz A., Kochanowski M., Heinze J. 2024a. Urban abiotic stressors drive changes in the foraging activity and colony growth of the black garden ant *Lasius niger*. *Science of The Total Environment* 915: 170157 https://doi.org/10.1016/j.scitotenv. 2024. 170157.

   The aim of this study was to test for differences between urban and rural abiotic factors (temperature and illumination regimes) and their impact on ant functional traits. This research was performed in collaboration with Prof. Juergen Heinze form the University of Regensburg, and the studies were performed in three cities in Poland and two cities in Germany.

   Generalist and synanthropic ant species (which includes invasive ones) can efficiently exploit urban areas, whereas more specialist species can be challenged by novel conditions (Trigos-Peral & Reyes-López 2025). Therefore, the environmental urban conditions might act as selective pressure favouring synanthropic ant species like *Lasius niger* — commonly found in urban areas— or invasive ones. During the cold season in 2019, I observed a colony of Lasius niger nesting near a sewer drain cover in a parking area that remained warm due to the building's heating system. While nearby, more distant colonies remained inactive, this colony stayed active. This observation led me to consider the potential advantages that urban environmental conditions may offer to certain ant species and laid the foundation for the aforementioned project proposals, of which this study is a part.

   Although numerous studies have examined the impact of the Urban Heat Island (UHI) effect on ant communities, all have been conducted during the day, overlooking the importance of the unique characteristics of urban environments at night. This study investigates the impact of night warming (NW) and artificial light at night (ALAN) on ant phenology by combining pairwise urban–rural nighttime field observations with a common garden experiment in the laboratory, simulating urban and rural temperature and light conditions to test the effects of these abiotic factors. As the intensity of UHI varies depending on the size and structure of a city, nighttime observations were conducted in three Polish cities (Warsaw, Kraków, and Gdańsk) and two German cities (Regensburg and Berlin). The laboratory experiment included ant populations from Warsaw and Regensburg. The results showed that, in general, nighttime temperatures in urban areas were higher than in rural ones, but the magnitude of these differences was related to city size. Furthermore, the study reveals for the first time that increased night warming and ALAN in urban areas facilitate foraging activity in synanthropic species, such as *Lasius niger*. Moreover, results also show that the warm urban

temperatures can accelerate the growth of their colonies by reducing the developmental time of brood but it also increase the worker mortality due to heat stress. Additionally, the study highlights differences in locomotor traits between urban and rural ant populations, suggesting reduced competition for resources in urban areas—presumably due to biotic homogenization—with urban foragers exhibiting slower movements, reduced exploration, and lower boldness. These findings also suggest potential evolutionary adaptations of urban populations to novel environmental conditions—such as elevated temperatures, light pollution, and altered competitive dynamics—as rural ant populations exhibited a stronger response to urban pressures than their urban counterparts.

This research has been pioneering in investigating the effects of Night Warming (NW) and Artificial Light at Night (ALAN) on ant communities and is among the very few studies addressing the impact of these environmental stressors on arthropods. Given the parallels with broader ecological trends, the study also contributes to a deeper understanding of how ant communities may respond to global warming. Furthermore, together with the following study included in this research achievement, it forms the foundation for my current research on urban nutritional ecology and underpins the grant proposals I currently have under evaluation.

4. **Trigos-Peral G.,** Witek M., Csata E., Chudzik P., Heinze J. 2024b. Urban diet as potential cause of low body fat content in female ant sexuals. *Myrmecological News* 34: 181-190. https://doi.org/10.25849/myrmecol.news_034:181.

   The aim of this study was to test whether urban and rural areas differ in dietary offer and how those differences impact ant communities. This study was performed in collaboration with Prof. Juergen Heinze from the University of Regensburg (Germany) and funded by the Polish National Agency for Academic Exchange (NAWA PPN/BDE/2020/1/00016).

   During my research career, I have observed the widely studied phenomenon of biotic homogenization in urban habitats. Given that ants feed on aphid honeydew and prey on other animals, I was interested in whether the biodiversity decline would be reflected in their dietary preferences and physiology.

   In this study, I tested for differences in dietary preferences (carbohydrates, proteins, and proteins+fat) and body fat content between urban and rural ant colonies, using body fat as an indicator of potential nutritional limitations in urban environments. To this end, colonies from both habitat types were offered three different diets, and the body fat content was measured in urban and rural gynes (female sexuals). The results revealed clear differences in nutritional preferences: urban colonies consumed more carbohydrates, whereas rural colonies favoured proteins and fats. Additionally, urban gynes exhibited lower body fat content, which may compromise colony development, as fat reserves are critical for the reproductive success of queens. These findings suggest potential limitations in urban nutritional availability, likely associated with biotic homogenization. Alternatively, the reduced fat reserves observed in urban gynes might reflect an evolutionary adaptation to

urban dietary conditions, where founding queens may require fewer body reserves due to reduced competition for nesting sites in low-biodiversity urban habitats.

Overall, these results provide novel insights into the impacts of urban biotic stressors on arthropod communities, indicating both nutritional constraints and potential evolutionary adaptations in urban ant colonies. Furthermore, this study has generated several hypotheses regarding nutritional ecology and evolutionary responses, forming the basis for my future research in urban ecology.

4.1.3. Summary

The results of my research demonstrate that the impact of urban environments on ant communities arises from a combination of independent pressures exerted by both biotic and abiotic factors. On the one hand, the type of urban greenery and its management are key determinants of arthropod community composition and influence the susceptibility of habitats to biological invasions (**Trigos-Peral et al. 2020**). Once invasive ant species establish themselves, they pose a significant threat to native communities—not only due to their ecological plasticity but also their behavioural plasticity (**Trigos-Peral et al. 2021**). My research has shown that two of the most invasive ant species in Europe can modify their behaviour and adopt diverse strategies that facilitate their coexistence in urban environments (**Trigos-Peral et al. 2024a**), thereby amplifying their ecological impact in the areas they invade.

Urban areas are also characterized by higher temperatures compared to rural areas—even at night (Night Warming, NW)—as well as increased light pollution due to Artificial Light at Night (ALAN). The combination of these two environmental stressors serves as a selective force for synanthropic ant species, promoting extended foraging activity and accelerating colony growth (**Trigos-Peral et al. 2024a**). Furthermore, urban and rural ant workers exhibit differences in locomotory traits, suggesting the presence of distinct competitive pressures for resources (**Trigos-Peral et al. 2024a**).

In addition, dietary resources in urban environments appear to be scarcer or of lower quality, resulting in differing nutritional preferences between urban and rural populations. Evidence of lower body fat content in urban gynes (female sexuals) aligns with the hypothesis of nutritional limitations in cities and may indicate evolutionary adaptations to these constraints (**Trigos-Peral et al. 2024b**).

These findings provide new insights into the influence of underexplored urban stressors on ant communities and likely extend to other arthropod groups. The knowledge gained from this research can inform the development of more sustainable and conservation-oriented urban planning strategies. While these results are specific to urban ecosystems, they also offer valuable perspectives for predicting biodiversity trends under broader global change scenarios.

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Trigos-Peral G., Reyes-López J.L. 2025. The Aging of Urban Gardens Can Enhance Their Role as Refuges for Local Ant Species. Diversity, 17(1): 64.

4.2. Other selected scientific achievement

My second notable scientific achievement is a comprehensive study on ant behaviour, presented in two scientific papers. This research delves into ant personality from two distinct perspectives: the individual level and the colony level. The papers have been published in two distinguished journals in ecology: ***Behavioural Ecology*** [**IF_{2021} = 3.087; MEiN points = 140**] and ***Insectes Sociaux*** [**IF_{2023} = 1.4; MEiN points = 70**].

1. Maák I., **Trigos-Peral G.**, Ślipiński P., Grześ I.M., Horváth G., Witek M. 2021. Habitat features and colony characteristics influencing ant personality and its fitness consequences. *Behavioral Ecology* 32 (1): 124–137.

   I declare that my contribution in this study included field work, data collection and participation for the edition of the first version of the manuscript as well as the reviewed versions.

   This paper explores how different habitat types (semi-natural meadows and meadows invaded by *Solidago* plants) and factors such as colony size, worker size, and nest density affect behavioural variations in *Myrmica rubra* ants. The study found that while the habitat type itself did not directly influence behaviour, habitat-dependent factors impact individual and colony-level behaviours, subsequently affecting colony productivity. Notably, exploration positively influenced productivity in both habitats, while worker aggression and activity had habitat-specific effects. This research highlights the importance of environmental pressures in shaping behaviour and productivity in ant colonies.

2. **Trigos-Peral G.**, Maák I., Ślipiński P., Witek M. 2023. Behavioral and morphological traits influencing variation in task performance of *Camponotus vagus* ants. *Insectes Sociaux* 70 (4): 451-461.

   I am the first and corresponding author of this article. I declare that my contribution in this study included field work, data collection, data analysis, preparation of the first version (which I then consulted with the co-authors) and preparation of the reviewed and final published version of the manuscript.

   This paper investigates task syndrome in ants, focusing on how the division of labor is influenced by individual behavioural traits, using *Camponotus vagus* ants as our model species. The findings revealed that ants remaining in the nest to care for brood were less aggressive, exhibited lower exploration skills, and had different lifespans compared to their peers who began foraging early in life. These results demonstrate significant behavioural variability within ant colonies and support the concept of task syndrome. Additionally, they underscore the critical role of intra-colony behavioural variation in the overall functioning of the colony.

Together, these two publications emphasize the importance of both intra-colony behavioural variation and environmental influences in the functioning and productivity of ant colonies.

The statements of all co-authors of the above-mentioned publications regarding their contributions can be found in the Annex I.

5. Presentation of significant scientific or artistic activity carried out at more than one university, scientific or cultural institution, especially at foreign institutions

5.1. Research activity

I started my research career as a PhD student at the Faculty of Sciences, University of Cordoba (Spain). Later, I moved to Poland, where I joined the Laboratory of Social and Myrmecophilous Insects at the Museum and Institute of Zoology, Polish Academy of Sciences. I have since advanced to my current role as an Assistant Professor. Throughout my post-doctoral career, I have collaborated with various researchers and institutions both in Poland and internationally. These include the Laboratory of Behavioural Ecology at Jagiellonian University (Cracow, Poland), the Department of Zoology at Poznan University of Life Sciences (Poznan, Poland), the Hungarian Department of Biology and Ecology at Babeș-Bolyai University (Cluj Napoca, Romania), the Biological Station of Doñana – CSIC (Seville, Spain), the Department of Zoology and Evolutionary Biology at Regensburg University (Regensburg, Germany), the Laboratory of Experimental and Comparative Ethology at Sorbonne Paris Nord University (Paris, France), and the Department of Zoology at the University of Granada (Granada, Spain).

My research efforts have resulted in 36 scientific publications, with 30 featured in international journals indexed in the Web of Science Core Collection, and two book chapters. I am the first author of 19 publications and the corresponding author of 23 scientific papers, and the senior author of three scientific papers. More detailed information about my scientific contributions can be found in Annex II.

Before obtaining my PhD

During my undergraduate studies in biology, I enjoyed three-months internship as intern in the Department of Zoology (University of Cordoba), where I learnt how to take care of termites at the laboratory, individuals marking, estimation of nest size in the field and ecology of *Reticulitermes grassei*. A few years after, I started my unofficial collaboration with the Department of Ecology, Botany and Plant physiology at the University of Cordoba (Spain), where I performed my PhD studies. years after. Being my first contact with the myrmecology, I learnt sampling methodologies in field (pitfall traps and direct search) and at the laboratory. I segregated the captured material and gave my first steps in taxonomical identification of Mediterranean ant species. I also started to rear my first artificial ant colonies of *Messor barbarus* as amateur.

In 2007-2008, I received a scholarship from the regional government of Andalusia (Junta de Andalucía) named Hercules III – Arbeit und Leben, which took me to Hamburg (Germany) to work at Haus der Natur, an educational institution in a protected natural area. There, I learnt about the fauna and vegetation of north European forests. In 2008, I moved to Granada, Spain,

to obtain the Teaching Aptitude Certificate (Curso de Aptitud Pedagógica, CAP) at the University of Granada. In 2009, I began my PhD studies at the University of Cordoba, and in 2010, I earned the Diploma de Estudios Avanzados (DEA) [Equivalent to Master of Research] after defending my Master's thesis: "Primera relación de los formícidos (Hym., Formicidae) de Reserva Natural Lagunas de Campillos (Málaga)" ["First report of the ants (Hym., Formicidae) from the Lagunas de Campillos Natural Reserve (Málaga)"]. The results of the thesis were published in 2013 in Boletín de la Asociación Española de Entomología (Trigos-Peral et al. 2013).

I continued my PhD studies as a part-time while working full-time (2008–2013) as a nutritionist in a private dietetic company. This job allowed me to deepen my understanding of the physiological effects of nutrition in humans through various internal training and nearly five years of experience. Parallelly, during my PhD studies (2009–2015), I focused on urban ecology, investigating the impact of environmental factors on biotic communities in urban ecosystems using ants as bioindicators. My PhD research concluded with a thesis entitled "Papel de las zonas urbanas en las estrategias globales de conservación usando hormigas como bioindicadores" ["Role of urban green areas in global conservation strategies using ants as bioindicators"]. Up to date, two of the chapters of my PhD thesis have been published. The novel interpretation of species bioindication in urban greeneries was published in *Iberomyrmex* (Trigos-Peral & Reyes-López 2016), and a long-term monitoring of ant communities was published in *Diversity* (Trigos-Peral & Reyes-López 2025). These publications represent significant contributions to the field, including one of the few long-term studies monitoring ant communities yearly and demonstrating the positive influence of urban garden management on local native species populations.

Before completing my PhD, I moved to Warsaw, Poland, where I began working as a biologist at the Laboratory of Social and Myrmecophilous Insects at the Museum and Institute of Zoology (MiIZ, PAS), under the leadership of prof. Wojciech Czechowski, where I participated in a study lead by dr hab. Magdalena Witek (see point vii - section 5.3). This work was my first contact with behavioural studies and host-parasite interaction. This experience has significantly impacted my scientific development as the basis for understanding more deeply the mechanisms of species interactions in arthropods, through my participation in field work, laboratory experiments and genetic works.

After obtaining my PhD

Following my PhD dissertation, I continued my research in urban ecology at MiIZ (PAS), first as a Specialist (2015) and later as an Assistant Professor (2018). My studies focused on the relationship between urbanization and ant community composition (Trigos-Peral & Reyes-López 2020, Trigos-Peral et al. 2020) or establishment of invasive species (Trigos-Peral & Reyes-López 2016; Trigos-Peral et al. 2020, 2024a,b).

Since 2014, during my tenure at MiIZ (PAS), I participated in various projects related to host-parasite interactions, thermal adaptations, behavioral ecology, vibroacoustics, red wood ant ecology, and nutritional ecology. This experience allowed me to gain knowledge and expertise in these research fields and resulted in several scientific publications in international journals.

I have extensively collaborated with prof.W. Czechowski, a renowned scientist in the field of ant ecology, and exceptional experts like dr hab. M. Witek, dr hab. Luca P. Casacci, dr. P. Ślipiński, dr. I. E. Maák, and dr. E. Csata. The results of our studies have raised interest of the public in different occasions, being the subject of posts in scientific blogs, potscads, or interviews (see section 6.3.2).

My time at MiIZ also expanded my knowledge of ant taxonomy and the ecology of European species through fieldwork and laboratory studies across different European countries. Moreover, during these years, I have enjoyed a total of 5 research visits to the Hungarian Department of Biology and Ecology at Babeq-Bolyai University (Cluj Napoca, Romania), where I have prepared one manuscript about the impact of the territorials Formica sanguinea and Formica exsecta on subordinate co-existing species (Trigos-Peral et al. 2016) and performed field works in collaboration with prof. Balint Markó. In general, during my career in MiIZ, I improved my skills in field and laboratory setups, genetics, statistical analyses, and the use of various software for statistical analyses and behavioural observations. The results of these studies represent most of my list of publications during my research career (see Anex II).

These advancements in my research career enabled me to successfully apply for two research project competitions in 2019 and 2020. From 2019 to 2022, as the PI of the projects funded by the Polish National Science Centre (NCN – Miniatura 3 2019/03/X/NZ8/0177) and the Polish National Agency for Academic Exchange (NAWA - PPN/BDE/2020/1/00016, Research Grant for bilateral collaboration Poland-Germany), I led a large-scale research performed in 5 cities of two countries (Poland and Germany) in collaboration with the University of Regensburg. I studied the impact of urban abiotic and biotic stressors on ant functional traits. The studies, published in international journals, were pioneering in testing the impact of urban abiotic stressors, such as night warming and artificial light at night, on ant functional traits (Trigos-Peral et al. 2024a). Additionally, they revealed for the first time the dietary differences between urban and rural ants and their consequences on female body fat content (Trigos-Peral et al. 2024b). Besides, these studies also facilitated new collaborations with Prof. Dr. Hab. Juergen Heinze or Dr. Tomer J. Czaczkes, evolving into a long-term partnership.

In 2020-2021, I undertook a seven-month research visit at the Biological Station of Doñana – CSIC in Seville, Spain. During this visit, I gained insights into the ecology of invasive species, analysed data, and prepared a manuscript for submission to *Biological Invasions* (Trigos-Peral et al. 2021). I also performed taxonomical identification of material from research in burnt forests and learned about fire ecology, collaborating with expert scientists in this fields such as Dr. Elena Angulo and Dr. Xim Cerdá. The resulting publication from this visit was the first to demonstrate the behavioural regulation of aggressiveness in invasive species sharing a common territory in the invaded area.

Currently, I am delving into the influence of nutritional shifts in urban habitats on ant physiological traits and their adaptations to high temperatures. To perform this research, I have undertaken 1-week research visit at the Laboratory of Experimental and Comparative Ethology through at the Sorbonne Paris Nord University (Paris, France) where I have gained knowledge on the extraction and analysis of cuticular hydrocarbons (CHCs) under the guidance of the renowned scientist, Prof. Dr. Hab. Patrizia d'Ettorre. Additionally, I am learning

methodologies and analyses in genomics under the guidance of a distinguished expert like Prof. Dr. Hab. Tadeusz Malewski from MiIZ (PAS). The expected results will provide novel knowledge in the fields of urban and nutritional ecology. Complementarily, I have started two new collaborations. The first one is a large-scale project led by Dr. Irene Piccini (PI), which analyzes the role of urban road verges in the dispersal of pollinators within cities (Polonez 3 - 2022/47/P/NZ8/01208). The second one is a collaboration with Prof. Dr. Hab. Francisca Ruano Díaz at the University of Granada (Granada, Spain). Together, we co-supervise a Master's thesis that investigates the invasive potential and supercoloniality of an endemic ant species from the Iberian Peninsula (*Tapinoma ibericum*,).

All mentioned scientific publications can be found in Anex II.

5.2. Reviews for scientific journals

I have reviewed over **76** manuscripts for international scientific journals, including:

Animal Biodiversity and Conservation (1), Arthropod-plant interactions (2), Behavioral ecology and sociobiology (1), Biodiversity and conservation (1), Biological invasions (1), Chemosphere (1), Current zoology (1), Community ecology (1), Ecological entomology (1), Ecological indicators (36), Ecology and evolution (2), Entomological science (1), Insect conservation and diversity (1), Insect science (1), Insectes sociaux (2), International journal of tropical insect science (1), Journal of animal ecology (1), Journal of applied entomology (2), Journal of insect conservation (1), Journal of zoology (2), Methods in ecology and evolution (1), Myrmecological News (2), Oecologia (1), PeerJ (1), Pest management science (1), Polish Journal of Ecology (1), Proceedings of the Royal Society B (1), Scientific reports (2), SN Applied Sciences (1), Sociobiology (1), Urban ecosystems (2), Urban forestry and Urban greening (1), Zootaxa (1).

Moreover, I have also reviewed **8** manuscripts for local scientific journals, including:

Annales de la Société entomologique de France (1), Biogeographia (1), Boletín de la Asociación Española de Entolomogía (2), Boletín de la Sociedad Andaluza de Entomología (1), Ecosistemas (1), Journal of tropical Science (1), Sociedad Entomológica Aragonesa (1)

5.3. Research projects

Before obtaining my PhD

As Co - Investigator

2015 – Podatność kolonii mrówek na pasożytnictwo społeczne oraz wpływ pasożytów społecznych na dostosowanie kolonii gospodarzy [Susceptibility of ant colonies to social parasitism and the influence of social parasites on the fitness of host colonies] Project nr -

UMO-2012/04/S/NZ8/00218, FUGA – Research Grant funded by the Polish National Science Centre (NCN).

After obtaining my PhD

As Principal Investigator:

2015 – Personality in ants' risk behaviour, Gwiazda 2015, Internal research grant at the Museum and Institute of Zoology (PAS) for financing individual projects.

2019 –Wpływ "miejskich wysp ciepła" na aktywność sezonową i dobową pospolitych gatunków mrówek" [Influence of "urban heat islands" on the seasonal and daily activity of common ant species], Miniatura 3, Project nr - NCN 2019/03/X/NZ8/0177, Research Grant funded by the Polish National Science Centre (NCN).

2020-2022 –Wpływ urbanizacji na fenologię mrówek [The effect of urbanization on ant phenology], Bilateral exchange between Poland and Germany, Project nr - PPN/BDE/2020/1/00016, Research Grant for bilateral collaboration Poland-Germany funded by the Polish National Agency for Academic Exchange (NAWA).

As a collaborator:

2016-2019 – Personality in ants and factors influencing its development. Project nr - UMO-2015/17/B/NZ8/02492, Research Grant funded by the Polish National Science Centre (NCN). PI – M. Witek, Collaborator – G. Trigos-Peral. Contribution: field work, species identification, behavioural tests, colonies maintenance, drafting of manuscripts, participation in congresses.

2018 – Spanish woodlands and global change: threats and opportunities (MONTES). Project nr - CSD2008-00040, Research Grant funded by the Consolider-Ingenio 2010 (Spanish Administration, Ministry of economy and competitivity). PI – J. Retana (kierownik). Collaborator – G. Trigos-Peral. Contribution: species identification, preparation of database, statistical analyses.

2018-2019 – VIBRANT - Evolution of VIBRoacoustic communication in ANTs. Project nr - 2016/23/P/NZ8/04254, POLONEZ 3, Research Grant funded by the Polish National Science Centre (NCN). PI – L.P. Casacci, Collaborator – G. Trigos-Peral. Contribution: field work, species identification, behavioural tests, colonies maintenance, dissection of stridulatory organs, vibroacoustic recordings, data curation.

2020 - Kolonizacja gniazd ptaków przez mrówki: mutualizm, komensalizm czy przypadek?. Project nr - 2017/26/D/NZ8/01063, Research Grant funded by the Polish National Science Centre (NCN). PI – Marta Maziarz. Contribution: field work, ant species identification, editing first and reviewed versions of the manuscript.

2023-2024 – Who is pulling the strings? The importance of nutrition in a host-parasite system. Project nr - UMO-2022/45/P/NZ8/04018, POLONEZ BIS 2, Research Grant funded by the

Polish National Science Centre (NCN). PI – E. Csata, Collaborator – G. Trigos-Peral. Contribution: field work, species identification, behavioural tests, colonies maintenance, survival studies, drafting of manuscripts, participation in congresses.

2024-2025 – POLLINATORS et al.: POLLINATOR StreETs as vitAL connections to maintain functional urban areas. Project nr - 2022/47/P/NZ8/01208, POLONEZ BIS 3, Research Grant funded by the Polish National Science Centre (NCN). PI – I. Piccini, Collaborator – G. Trigos-Peral. Contribution: Responsible of the field work performed in Warsaw, supervision of the creation of taxonomical collection, team coordination, field work, data curation, students' supervision, co-supervision of Master thesis of P. Pirahmadi.

2025 – MonitAnt: Developing a European-level Monitoring strategy for mound-building *Formica* Ants and symbiont communities residing in nest mounds. Project nr - 2022/47/P/NZ8/01208, Biodiversa +, Research Grant funded by the Biodiversa + (European Biodiversity Partnership). PI – H. Feldhaar, Collaborator – G. Trigos-Peral. Contribution: Field work in Warsaw, data curation, participation in workshop, leader of the study focused on red wood ants and bark beetles relationship.

5.4. Other research activity

The years 2020 and 2022, I was hired by the Forest Research Institute [Instytut Badawczy Leśnictwa], in Raszyn (Poland), to perform different tasks related to the research entitled: "Study of ants collected as part of the Biebrza after the fire project – the impact of the fire on selected natural elements of the Biebrza National Park". My tasks included taxonomical identification of ant specimens collected during the research, preparation of a database, preparation of characteristics of species collected during the research, initial statistical analyses of ants collected during the research. The information provided from my work has been used in the publications "Impact of Large-Scale Fire and Habitat Type on Ant Nest Density and Species Abundance in Biebrza National Park, Poland" (Sondej & Domisch 2024) and "Reaction of Wood Ants to a Large-Scale European Spruce Bark Beetle Outbreak in Temperate Forests" (Sondej & Domisch 2024).

5.5. Scientific conferences

During my research career, I have actively participated in a total of **29** national and international conferences as presenting author in form of oral presentation or poster, as well as a co-author.

1. **Trigos Peral G.**, Babik H., Grzés I.M., Morón D., Casacci L.P., Walter B., Ślipiński P., Witek M. 2015. Influence of goldenrod invasion on ant species diversity and colony life history traits. Oral presentation. *IV Central European Meeting of IUSSI, Lichtenfels, Germany, 26–29 April 2015.*
2. **Trigos Peral G.**, Reyes-López J.L., Witek M. 2015. First list of ants of Natural Park of Sierra Tejeda, Almijara y Alhama (Andalusia, Spain): A new environment to discover.

Poster. *IV Central European Meeting of IUSSI, Lichtenfels, Germany, 26–29 April 2015.*

3. **Trigos Peral G.**, Reyes-López J.L. 2015. Ants in urban green: Their relationship with the environment in a 10-year study in the south of the Iberian Peninsula. Oral presentation. *6th CEWM. Central European Workshop of Myrmecology, Debrecen, Hungary, 24–27 July 2015.*
4. **Trigos Peral G.**, Ślipiński P., Babik H., Witek M. 2015. Arms race between *Myrmica* ants and their social parasites. Oral presentation. *III Polish Evolutionary Conference, Poznan, Poland, 24–26 September 2015.*
5. **Trigos Peral G.**, Witek M., Ślipiński P., Babik H., Czechowski W. 2015. Urban parks in Warsaw: more managed, more suitable for ants?. Oral presentation. *XI Congreso Ibérico de Mirmecología Taxomara 2016, Murcia, Spain, 13–15 July 2016.*
6. **Trigos Peral G.**, Reyes-López J.L. 2016. Las hormigas como bioindicadores para la gestión de zonas verdes urbanas en el sur de la península ibérica. Propuesta de grupos funcionales. Poster. *XI Congreso Ibérico de Mirmecología Taxomara 2016, Murcia, Spain, 13–15 July 2016.*
7. **Trigos Peral G.**, Witek M., Ślipiński P., Babik H., CzechowskiW. 2017. Influence of management on the myrmecofauna of urban green areas of Warsaw. Oral presentation. *7th Central European Workshop of Myrmecology, Cracow, Poland, 21–24 April 2017*.
8. Witek M., Ślipiński P., **Trigos Peral G.**, Maák I. 2017. The effect of habitat quality on ant colony personality. Oral presentation. *7th Central European Workshop of Myrmecology, Cracow, Poland, 21–24 April 2017*.
9. Sánchez-García D., Cuesta-Segura A. D., Aleix Herraiz J., **Trigos Peral G.**, García García F., Catarineu C., Arcos González J., Fernández Martínez J. A. 2017. Listado actualizado de las hormigas de la península ibérica e islas baleares (Hymenoptera: Formicidae*).* Poster. *Congreso Ibérico de Mirmecología Taxomara 2016, Madrid, Spain, 21–24 July 2017*.
10. **Trigos Peral G.,** Maák I. E., Ślipiński P., Witek M. 2018. Personality traits and task performance in *Camponotus vagus* ants. Poster. *XVIIIth Congress of the International Union for the Study of Social Insects, Guarujá, Brasil, 5–10 August 2018*.
11. Maák I. E., Ślipiński P., **Trigos Peral G.,** Witek M. 2018. Habitat type and colony personality traits affect production in Myrmica ants". Oral presentation. *XVIII Congress of the International Union for the Study of Social Insects, Guarujá, Brasil, 5–10 August 2018*.
12. Casacci L.P., Witek M., **Trigos-Peral G.**, Ślipiński P., Czechowski W.: Evolution of vibroacoustic signals in myrmicinae ants. Oral presentation. *2nd International Symposium on Biotremology, Riva del Garda, Italy, 4–6 September 2018*.
13. **Trigos Peral G.,** Abril S., Angulo E. 2018. *Lasius neglectus* vs *Linepithema humile*: two invasive species from different continents and similar strategy of colonization meeting in invaded areas. Poster. *6th Polish Evolutionary Conference, Warsaw, Poland, 26–28 September 2018*.
14. Maák I. E., Ślipiński P., **Trigos-Peral G.**, Witek M. 2018. The effects of habitat type and

colony personality traits on the production of *Myrmica* ants. Oral presentation. *XX Magyar Etológiai Társaság (XX. Conference of the Hungarian Ethological Society), Cluj Napoca, Romania, 23-25 November 2018.*

15. **Trigos-Peral G.,** Abril S., Angulo E. 2019. Facing an invasion competing with an outstanding competitor: *Lasius neglectus* vs *Linepithema humile*. Poster. *Central European Meeting of the International Union for the Study of Social Insects - IUSSI 2019, Klosterneuburg, Austria, 19–21 March 2019*.
16. Casacci L. P., Witek M., **Trigos-Peral G.**, Ślipiński P., Czechowski W. Factors influencing the evolution of vibroacoustic signals in *Myrmicinae* ants. Oral presentation. *Central European Meeting of the International Union for the Study of Social Insects - IUSSI 2019, Klosterneuburg, Austria, 19–21 March 2019*.
17. Ślipiński P., **Trigos-Peral G.**, Maák I., Wojciechowska I., Witek M. The effect of worker's development temperature on the personality variation among workers within ant colony? Poster. *Central European Meeting of the International Union for the Study of Social Insects - IUSSI 2019, Klosterneuburg, Austria, 19–21 March 2019*.
18. **Trigos-Peral G.**, Abril S., Angulo E. *Linepithema humile* vs *Lasius neglectus*: dos invasoras compitiendo por un territorio [*Linepithema humile* vs *Lasius neglectus*: two invasive species competing for a territory]. Oral presentation. *XIV Congreso Ibérico de Mirmecología – Taxomara 2019, Chefchaouen, Moroccoo, 18–20 July 2019*.
19. **Trigos-Peral G.**, Maák I., Ślipiński P., Witek M. Influence of the individual personality on the task specialization in *Camponotus vagus* ants. Oral presentation. *8th CEWM, Central European Workshop of Myrmecology, Regensburg, Germany, 27–29 September 2019*.
20. Maák I., Camera J., Casacci L. P., Barbero F., **Trigos-Peral G.**, Ślipiński P., Bonelli S., Zaccagno M., Witek M. How colony traits influence the collective behavior of *Myrmica scabrinodis* ants? Oral presentation. *8th CEWM, Central European Workshop of Myrmecology, Regensburg, Germany, 27–29 September 2019*.
21. **Trigos-Peral G.**, Juhász Orsolya, Máak Istvan. 2020. Wood ants, as important components of forest "immunity system". Oral presentation. *1er Simposio Iberoamericano de Mirmecología, 27–28 Noviembre and 4–5 December 2020, online, Grupo de Estudio de Hormigas Neotropicales (GEHN), Popayán, Colombia*.
22. Chudzik P., Schmid S., Maák I. E., Witek M., Casacci L.P. , Czaczkes T., Sánchez García D., Kochanowski M., Heinze J., **Trigos-Peral G.** Urban heat island effect on *Lasius niger* foraging activity [El efecto de la isla de calor sobre la actividad de forrageo de *Lasius niger*]. Oral presentation. *XVI Congreso Internacional de Mirmecología Taxomara 2021 - Virtual, on-line, 11–12 December 2021*.
23. Ślipiński P., **Trigos-Peral G.**, Maák I. E., Wojciechowska I., Witek M. (2021): A dolgozók kora és a lárvák fejlődése során mért hőmérséklet hatása a dolgozók hőmérséklethez köthető táplálékkeresési kockázatvállalására a *Formica cinerea* hangyafaj esetében. *XII. Magyar Ökológus Kongresszus (XII. Congress of Hungarian Ecologists), Vác, Hungary, 24-26 August 2021*.

24. **Trigos Peral G.**, Maák I., Magdalena Witek, Daniel Sánchez García and Luca P. Casacci. 2022. Effect of urbanization on life history traits of the common garden ant *Lasius niger*. Book of abstracts, *8th Polish Evolutionary Conferences, Toruń, Poland, 19–21 September 2022*.
25. **Trigos-Peral G.**, Witek M., Chudzik P., Lőrincz A., Sánchez-García D., Maák I.E., Heinze J. 2023. Development of ant colonies in an urban-rural gradient. Oral presentation. *6th Polish Congress of Genetics, Cracow, Poland, 27–30 June 2023*.
26. Castro-Cardoso M., **Trigos-Peral G.**, Chiara V., Cordero-Rivera A., Sanmartín-Villar I.: Interaction between introduced psyllids and native and exotic ants in eucalyptus plantations. Poster. *XII European Conference of Entomology, Heraklion, Greece, 16–20 October 2023*.
27. Trigos-Peral G., Kochanowski M., Ślipiński P., Witek M., Csata E. 2024 Abundance and specificity of *Aegeritella* (Pezizomycotina, Ascomycota) fungal infection in Red Wood Ants. Oral presentation. *9th Central European Workshop of Myrmecology, Sibiu, Romania. 8-11 September 2024*.
28. Csata E., Cordonnier M., **Trigos-Peral G.**, Heinze J., Csősz S., Witek M., Markó B. 2024. Ant colonies buffer the negative effects caused by a fungal ectoparasite. Oral presentation. *European IUSSI congress 2024, Laussane, Switzerland, 7-11 July 2024*.
29. Venn S., **Trigos-Peral G.**, Sienkiewicz P., Konwerski S., Desiderato A. 2024. Functional traits determine species composition under different levels of disturbance in the urban green infrastructure of Warsaw, Poland. Oral presentation. *XXI European Carabidologists Meeting, Budapest, Hungary, 3-5 June 2024*.

5.6. Scholarships

As a PhD, I have been granted with two scholarships in 2018:

1. Financial Support Program from International Union for the Study of Social Insects (IUSSI), Central European section. This scholarship provided financial support for attendance at the XVIII IUSSI International Congress in , Guarujá, Brazil (5 -10.08.2018) in which I actively participated as the presenting author of a poster and the co-author of an oral presentation (see Anex ----, 10 and 11).
2. Study visit at MIiZ (Financial Support Program from PAS), Warszawa, Polska. This scholarship provided financial support to invite a foreigner researcher (Prof. Dr. Hab. Xim Cerdá) to reinforce new collaborations and to plan bilateral research. Resulting from this visit, I started my collaboration in a project investigating the impact of fires on Mediterranean forests communities (with Dr. Elena Angulo (a member of the department of Prof. Xim Cerdá in Biological Station Doñana, Seville, Spain) 17-21.11.2018.

Documents confirming research fellowships can be found in Anex III.

5.7. Awards

I obtained the distinctive award “Hormiga de plata” from the Iberian Association of Myrmecology (Asociación Ibérica de Mirmecología – AIM) in July 2015 as a recognition of my 10-years study presented in my PhD tesis.

6. Presentation of teaching and organizational achievements as well as achievements in popularization of science or art

6.1. Teaching achievements

After obtaining my PhD

Since I started working in MiIZ PAS, I have been the tutor for 12 students from different universities and countries.

In 2018, I was a co-supervisor of a graduate student, Iga Wojciechowska, from the Cardinal Stefan Wyszyński University (UKSW), Faculty of Biology and Environmental Sciences in Warsaw. The title of the bachelor’s thesis was: "Interakcje pomiędzy inwazyjną mrówką *Lasius neglectus* i terytorialną mrówką *Lasius niger*” [Interaction between invasive garden ants Lasius neglectus and native garden ants *Lasius niger*]; the degree obtained in 2019. The main supervisor was prof. J. Romanowski from UKSW from the Faculty of Agriculture and Biology, the University of Life Sciences in Warsaw.

From 2019 till 2023, I was the supervisor of the bachelor’s internship of Hubert Płóciennik (2019) from the Adam Mickiewicz University in Poznan, Volha Niadzvetskaya (2021) and Michał Kochanowski (2021) from University of Warsaw in Warsaw, Paulina Chudzik (2021) from HAN University of Applied Sciences in Nijmegen (The Netherlands), Sophie Smitd (2021) from the University of Regensburg (Germany), Franciszek Mika (2023, 2024) from Warsaw University of Life Sciences in Warsaw, Artur Szpalek (2023) from Warsaw University of Life Sciences in Warsaw, Sylwia Ćwietków (2024) and Mauritius Nowak (2024) from Warsaw University of Life Sciences in Warsaw and Parisa Pirahmani (2024) an Erasmus student from University Of Bari Aldo Moro in Bari (Italy).

Currently, I am acting as co-supervisor of the Master’s thesis of Parisa Pirahmani (the main supervisor is Prof. Giovanni Tamburini from the University Of Bari Aldo Moro, Bari, Italy), the Master’s thesis of Angel Peñalver (the main supervisor is Prof. Francisca Ruano Díaz from University of Granada, Granada, Spain) and the Bachelor’s tesis of Antonio Ammaturo (the main supervisor is dr Luca P. Casacci from University of Turin, Turin, Italy).

6.2. Organising international conferences

I have been part of the organizing committee of 2 international conferences of myrmecology and the main organizer of one more.

In 2019, I was part of the organizing and scientific committees of the XIV Congreso Internacional de Mirmecología - Taxomara 2019 Chefchaouen celebrated in Chefchaouen, Morocco, during 18-20 July 2019. This congress counted with a total of 33 participants from two countries (Spain, Morocco and Poland).

In 2020, I was part of the organizing committee of the XV Congreso Internacional de Mirmecología - Taxomara 2020 Virtual celebrated online from 20-1 and 27-28 June 2021, during the COVID-19 pandemic lockdown. This congress counted with a total of 104 participants from 5 countries (Spain, Portugal, Morocco, Poland and Germany.

In 2021, due to the great success in 2020 and the continuation of the COVID-19 restriction, I was the main organizer of the Taxomara Virtual 2021, celebrated online 11-12 December 2021. The congress counted with 103 participants from 15 countries in Europe, Africa and America. More detailed information can be found in the official website at https://taxomaravirtual2021.mirmiberica.org/.

6.3. Popularization of science

6.3.1. Lectures and short oral presentations

After my PhD, invited by the organizers, I gave a total of 11 seminars in Poland, Spain and USA.

2019 – "Ecology of ants and their role as bioindicator" and "Invasive species". Faculty of Sciences, University of Gdańsk, Gdańsk, Poland.

2020 – "Talking about anthropization: pests, invasions, urban ecology and, of course, ants". Biological Station of Doñana – CSIC, Seville, Spain.

2021 – "Ants, an amazing „tool" in urban ecology". Department of Ecology, University of Szeged, Szeged, Hungary.

2021 – "Diversity of ant studies". University of Warsaw, Warsaw, Poland.

2021 – Ants as bioindicators. Invited talk for the International day of women and girls in science at Instituto de Educación Secundaria Alfoz de Lara, Salas de los Infantes, Burgos, Spain.

2023 – "Influence of urbanization on the ant foraging activity, individual development and food preferences". Museum and Institute of Zoology of the Polish Academy of Sciences, Warsaw, Poland.

2024 – "¿Para qué sirven las hormigas? Las grandes desconocidas". Seminar for environmental awareness at Centro de Inserción Social - Manuel Montesinos Molina, Algeciras, Spain.

2024 – "Decoding Ants: Unravelling arthropod reactions to human activity". Institute of Systematics and Evolution of Animals of the Polish Academy of Sciences, Cracow, Poland.

2024 – "Urban challenges for ants". Department of Ecology, University of Szeged, Szeged, Hungary.

2025 – "Urban pressures on ant communities". Laboratory of Experimental and Comparative Ethology, Sorbonne Paris Nord University, Paris, France.

2025 – "Urban pressures on ant communities". Faculty of Sciences, University of Granada, Granada, Spain.

Since 2018 (annual), I am a lecturer in the online free course of entomology for amateurs "Curso básico de mirmecología". Entity: Asociación Ibérica de Mirmecología (AIM). Spain.

Since 2021, I have participated as an expert in different events of citizen science in charge of the ant workshop: La gran semana de la ciencia ciudadana por la biodiversidad (2021, Seville, Spain), IV Bioblitz UPO (2024, Pablo de Olavide University, Seville, Spain) and V Bioblitz UPO (2025, Pablo de Olavide University, Seville, Spain).

6.3.2. Media interviews

2019 – Interviewed researcher for the podcast "Ants: Tales from the underground" in "Science Vs" produced by Gimlet Media, USA; interviewed researcher for the journals: Neue Zürcher Zeitung - NZZ magazine, Switzerland; and interviewed researcher for "Enfermées dans un bunker, des fourmis deviennent cannibals" in Science et Vie, France.

2022 – Interviewed researcher at special radio program for the International day women and girls in science at Clandestino Radio, Campillos, Spain.

2022 – Invited researcher for Fundación endesa for press release and video chapter in a series about biodiversity in cities (Hormigas - ingenieras de ciudad). Spain.

2023 – Invited researcher for an episode in the tv documentary "¡Qué animal!" from Radio Televisión Española (RTVE). Spain.

2024 – Interviewed researcher for the blog of Insectes Sociaux for the post "Interview with a Social Insect Scientist: Gema Trigos-Peral". Online.

2024 – Interviewed researcher in Myrmecological News Blog for the photoblog "Nutritional constraints in urban ant colonies: a comparative study between urban and rural *Lasius niger* colonies". Online.

6.3.3. Popularization of science online

I popularized the results of my scientific research through my own social media profiles (Twitter, Bluesky and Facebook). Moreover, I am a member of the media team of the Museum and Institute of Zoology of the Polish Academy of Sciences aimed to popularize science online through the media profiles of this institution in Twitter and Bluesky.

Moreover, I have published two papers for general public in online open access journals for general public to spread basic knowledge and some curiosities of ant ecology and behaviour (Trigos-Peral 2018c, 2020d).

7. Apart from information set out in 1-6 above, the applicant may include other information about his/her professional career, which he/she deems important

After my PhD, I acted as a member of the PhD thesis committee in two PhD defence in Spain, evaluator of a PhD thesis in Italy and evaluator of a research fellowship for PhD studies in Belgium:

- 2020. Member of the PhD thesis committee of Mariola Silvestre Granda. Faculty of Science, Autonomous University of Madrid, Madrid, Spain.

- 2021. Member of the PhD thesis Committee of Francisco Jiménez-Carmona. Faculty of Sciences, University of Cordoba, Cordoba, Spain.
- 2025. External evaluator for PhD thesis of Stefania Smargiassi. Department of Biology, University of Florence, Florence, Italy.
- 2025. External evaluation for a PhD research fellowship. National Fund for Scientific Research (F.R.S.-FNRS), Brussels, Belgium.

In July 2024 I became associate editor of the scientific journal *Insectes Sociaux* (official journal of the *International Union for the Study of Social Insects*, publisher - Springer). Later, in November 2024 I became a member of the editorial board of the scientific journal *Fragmenta Faunistica* (Museum and Institute of Zoology, Polish Academy of Sciences). Certificates confirming these positions can be found in Annex III.

Finally, since 2009, I am a member of five scientific societies:

Asociación Ibérica de Mirmecología – AIM, Asociación Española de Ecología Terrestre (AEET), International Union for the Study of Social Insects (IUSSI) – Central European section, Asociación Española de Entomología (AEE) and Sociedad Andaluza de Entomología (SAE). Moreover, I acted as vicepresident of the Iberian Association of Myrmecology (Asociación Ibérica de Mirmecología – AIM) during the period 2018-2020 and as a member of the board during the period 2020-2023.

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