Marie Curie Actions – International Fellowships

Project n°: 247631
Project Acronym: ICARUS
Project Full Name: International Cooperation for the Advancement of Research on the Underlying System of Human Thermoregulation

Marie Curie Actions

IRSES Final Report

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Project coordinator organization name: Institut Jozef Stefan
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PROJECT PUBLISHABLE SUMMARY

It is beyond any doubt that environmental heat affects tremendously people's physiological functioning and, in turn, their psychological, social and cultural well-being. Classic heat illness and death are major public health issues during exposure to heat stress, particularly for infants, individuals with cardiovascular and respiratory disease and the elderly. Thousands of deaths among the elderly have been attributed to heat waves that have encompassed Europe in recent summers, while a higher frequency and intensity of heat waves is projected to lead to an increase in heat-related deaths as a result of global warming. In addition, exertional heat illness and death among highly motivated athletes and soldiers continue to surface during exposure to hot environments that may also involve the wearing of protective clothing. Indeed, heat stroke is a leading cause of death, second only to head and spinal injuries, amongst athletes.

This project addressed different aspects of human thermoregulation and its results will improve the existing preventive strategies designed to mitigate heat-induced morbidity and mortality. As such, the project was called ICARUS, after the mythical young man who's wings made of wax melted by the sun's heat resulting in a fatal fall into the sea. The ICARUS project included a multiannual joint programme of collaboration amongst four internationally-known research teams in the field of environmental physiology. These research teams with complementary expertise were based in three European research organisations and one Third Country University. The European-based research groups were led by Prof. Igor Mekjavic [Institut Jozef Stefan; Slovenia (IJS)], Prof. Hein Daanen [Nederlandse Organisatie Voor Toegepast Natuurwetenschappe Onderzoek; Netherlands (TNO)], and Dr. Andreas Flouris [Centre for Research and Technology Hellas; Greece (CRT)]. The Third Country-based research group was led by Prof. Timothy Noakes [University of Cape Town; South Africa (UCT)]. The ICARUS project created synergies between the three European research groups and the South African team by establishing long-term research cooperations through a coordinated joint programme of balanced exchanges of research staff for the purpose of joint research, training, networking, and workshops.

Overall, a total of 64 months of research staff exchange were carried out during the 4 years of the ICARUS project. A total of 48% of these research staff exchanges were carried out for the purpose of conducting joint research, 23% were focused on networking activities (joint publications, conference presentations, and planning future collaborative efforts), 19% were focused on research training, while 10% were carried out for the purpose of conducting workshops related to human thermoregulation. This distribution of exchanges is illustrated in Figure 1.

As illustrated in Figure 2, of the 64 exchange months, a total of 22 (representing 35%) were carried out by early-stage researchers (i.e., professional researchers in the first 4 years of their research careers, such as doctoral students or research technicians). The remaining 42 months (representing 65%) were carried out by experienced researchers (i.e., professional researchers already in possession of a

doctoral degree or having at least 4 years of research experience, such as post doctoral researchers, lab group leaders, and professors).

Figure 1. Distribution of exchange months in the different exchange plan activities.

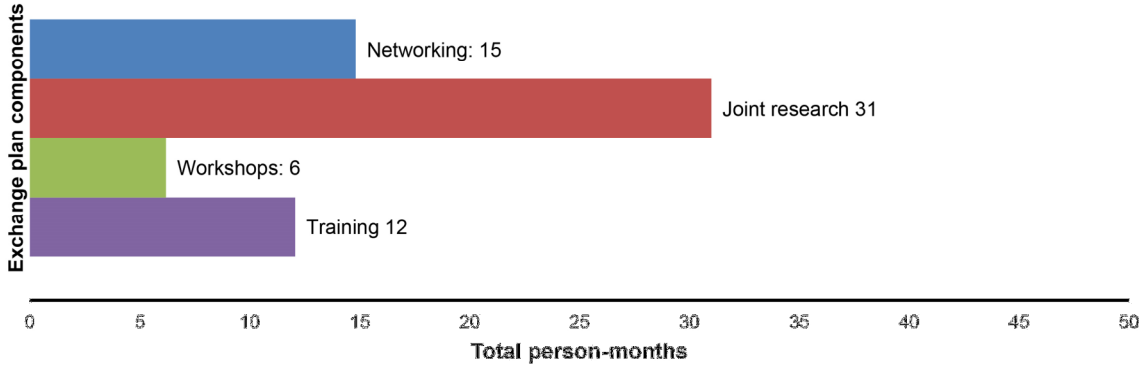
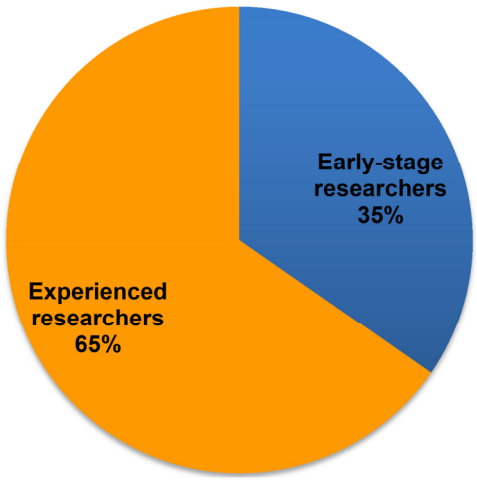


Figure 2. Distribution of exchange months between experienced and early-stage researchers.



In addition to increased knowledge transfer between the participants through training activities, workshops, and networking, several research studies were carried out during the ICARUS project producing a number of important knowledge outcomes. These include: (i) a study on the effects of chronic cold exposure on metabolism, conducted at UCT with the collaboration of CRT; (ii) a study conducted by IJS and UCT investigating the effect of inactivity, a nonthermal factor, on temperature regulation; (iii) a heatstroke project entitled “Excessive endogenous heat production as a cause in the development of exercise-induced heatstroke - with special reference to the possible relationship of an underlying muscle disorder” conducted by UCT and CRT; (iv) a study entitled “The influence of environmental conditions on the interpretation of the LSCT and 40 km time-trial performance” conducted at TNO with the collaboration of UCT; as well as (v) a study conducted by IJS and UCT investigating the possibility of improving heat tolerance during activity in simulated desert conditions.

Address of the project website: www.icarus-project-eu.com
List of Keywords: heat illness; thermoregulation; environmental physiology; exercise; work.
Websites where additional information may be found:
www.famelab.gr