Dr. Spyros Karakitsios
+30 6940253526
spyros.karakitsios@gmail.com

Dr. Spyros Karakitsios is an Exposure Biology Scientist, graduate from the Science and Culture Selection Curriculum of the Department of Physics of the University of Ioannina with a grade of 8.5 - Excellent (1st in his class), with an MSc in Chemical, Environmental and Computational Simulation Technology from the Department of Chemistry, and a PhD from the Department of Biological Applications and Technologies of the University of Ioannina. He then spent three years as a postdoctoral researcher at the European Commission's Joint Research Center at the Consumer Health and Protection Institute (JRC - IHCP). In 2011 he returned to Greece, to the Laboratory of Environmental Engineering of the Department of Technology of the Department of Chemical Engineering of the Aristotle University of Thessaloniki, where he continues to work as a Lab Manager, as well as in the HERACLES Research Center on the Exposome and Health, responsible for the day to day management of several EU projects on Environment and Health. His research is summarized in topics related to the science of the interaction of the environment in human health from chemical exposure, taking into account the physical, chemical and biological / biochemical processes that take place from the stages of industrial production of chemicals and their release, their course in the environment and how they end up affecting the human body, making the most of the results of experimental techniques and measurements (including sensors), using appropriate models. For the originality and importance of the processes and techniques it implements and proposes for chemical hazard analysis, he was awarded by the European Chemical Industry Council (CEFIC) in 2017 with the CEFIC-LRI - Long Range Research Initiative Award related to the assessment of risks from chemical mixtures.

Key qualifications:

- Exposure modelling (key developer of the INTEGRA platform)
- Multimedia environmental modelling
- Exposure assessment using sensors and chemical analysis data
- Exposure biology and exposome analysis
- PBPK modelling and interpretation of HBM data
- Use of omics and *in vitro* data in risk assessment / Adverse outcome pathways (AOPs)
- Health impact assessment using biology based dose response models
- Innovative methods for chemical risk assessment
- Project management (Deputy Scientific Coordinator for 15 EU projects)
- Experience in development of technical specification and technical solutions for equipment governed by the national procurement rules of the EU Member states

Personal information

Surname(s) / First name(s)	Karakitsios Spyridon
Address(es)	Thessaloniki, Greece
Telephone(s)	+30 2310 99 6225 Mobile: 0030 6940253526
E-mail(s)	spyros@eng.auth.gr, spyros.karakitsios@gmail.com
Nationality(-ies)	Greek
Date of birth	12/05/1975
Gender	Male

Desired employment / Occupational field

Exposure science, Biochemical and environmental engineering

Work experience

Dates	1/4/2011- to date
Occupation or position held	Lab Manager (2011 – to date) / Head of Exposure Biology Unit, Laboratory of Environmental Engineering (EnvE-Lab) / Department of Chemical Engineering Lab Manager (2015 – to date) / HERACLES Research Center on the Exposome and Health, Center for Interdisciplinary Research and Innovation, Greece
Main activities and responsibilities	Research activities- Contribution to scientific projects (see Annex 3)
Name and address of employer	CERTH/CPERI and Chemical Engineering department of AUTH, Thessaloniki, Greece
Type of business or sector	Research Institute - University

Dates	3/12/2007- 31/3/2011
Occupation or position held	Post-Doctoral researcher on exposure and biology based risk assesment
Main activities and responsibilities	Research activities- Contribution to scientific projects (see Annex 3)
Name and address of employer	JRC, ISPRA (VA), ITALY IHCP, CAT unit
Type of business or sector	Research Institute

Dates	1/09/2002 -30/11/2007
Occupation or position held	Contract agent – MSc (2002-2004) and PhD (2004-2008) student
Main activities and responsibilities	Research activities-Contribution to scientific projects (see Annex 3)
Name and address of employer	Pilidis George, Associate Professor, University of Ioannina, Ioannina, Greece
Type of business or sector	University

Education and training

Dates	2004-2008 (22/5/2008)
Title of qualification awarded	PhD
Principal subjects/Occupational skills covered	Thesis title: Assessment of population exposure to benzene / Analytical techniques of environmental samples, air pollution modelling, PBPK modelling.
Name and type of organisation providing education and training	Department of Biological Applications and Technologies, University of Ioannina, Greece
Level in national or international classification	Level 6

Dates	2002-2004
Title of qualification awarded	Master of Science (MSc) in Chemical, Environmental and Computational Simulation Technology
Principal subjects/Occupational skills covered	Thesis title: Parameters controlling benzene in ambient air / Environmental analytical techniques, modelling techniques.
Name and type of organisation providing education and training	Department of Chemistry, University of Ioannina, Greece
Level in national or international classification	Level 6

Dates	1998-2002
Title of qualification awarded	Environmental Sciences, Bachelor degree (8.5/10, excellent, 1st among 60 students)
Principal subjects/Occupational skills covered	Physics of atmosphere / air pollution modelling
Name and type of organisation providing education and training	Department of Physics, University of Ioannina, Greece
Level in national or international classification	Level 5

Personal skills and competences

Mother tongue(s) Greek

Other language(s)

Self-assessment

European level (*)

	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
Italian	A2	A2	A2	A2	A2
Romanian	A2	A2	A2	A2	A2

Awards

Awardee of the CEFIC LRI Innovative Science award for the year 2017

Finalist in the CEFIC LRI Innovative Science award for the years 2014 and 2015

2008-2011, Joint Research Center (EC), Institute for Health and Consumer protection, scholarship 3y for Post Doc research on "*Development of systems biology-based models for health risk assessment of chemicals in consumer products and the environment*"

State Scholarships Foundation (IKY), year 2003-2004, MSc in Chemical, Environmental and Computational Simulation Technology

State Scholarships Foundation (IKY), year 2001-2002, Bachelor in Environmental Sciences, 1st in his class.

Organisational skills and competences

EnvE.X (SME) Managing Director (2019 to date)
Administrative-Financial-Personnel manager in advertising company G.P.M S.A., (2005-2007).
Lab Manager in EnvE-Lab / Department of Chemical Engineering (2011 to date)

Technical skills and competences

PC hardware engineering

Computer skills and competences

Microsoft Office package and several other Windows Applications including Image processing (photoshop, Corel draw), Neural Networks, Statistics (Statistica, SPSS), Environmental, exposure and Biology-Based Modelling, acslX, GeneSpring

Other skills and competences

- Business, financial and project management. Experience in managing various financial instruments (FP6, FP7, HORIZON 2020)
- Experience in both Chemical Industry (3 CEFIC LRI projects) and Regulatory perspective (3.5. years of experience in EC JRC)
- Risk assessment, health impact (and related monetary) impact assessment using an array of methods, including both epidemiological and biology based methods

Driving licence(s)

Driving licence since 1994

Annexes

1. List of publications in peer-reviewed journals (89)
2. List of book chapters (7)
4. List of contribution to scientific projects (28)

Complete list of scientific journals and number of publications per journal

	Number	IF 2021
Aerosol and Air Quality Research	1	3.063
Air Quality, Atmosphere and Health	1	3.763
Altex	1	6.043
Annual Review of Public Health	1	16.463
Atmospheric Environment	5	4.798
BMC Public Health	2	2.837
Drug and Chemical Toxicology	1	3.356
Ecological Modelling	1	2.974
Environment International	2	9.621
Environmental Health	1	5.984
Environmental Modeling and Assessment	1	1.634
Environmental Modelling and Software	1	5.288
Environmental Monitoring and Assessment	2	2.513
Environmental Research	18	6.498
Environmental Science and Pollution Research	1	4.223
Epidemiologia and Prevenzione	2	0.770
Epidemiology	7	4.822
Fluids	1	1.81
Food and Chemical Toxicology	4	6.023
Fresenius Environmental Bulletin	4	0.370
Frontiers in Public HEALTH	1	2.483
Global NEST Journal	1	0.983
Journal of Exposure Science and Environmental Epidemiology	1	3.531
Indoor and Built Environment	1	3.015
International Journal of Environment and Pollution	1	0.354
International Journal of Environmental Research and Public Health	3	3.390
International Journal of Molecular Sciences	1	5.923
Materials Proceedings	1	1.24
Molecular Medicine Reports	1	2.952
Safety Science	1	4.877
Science of the Total Environment	10	7.963
Sensors	1	3.576
Theoretical and Applied Climatology	1	2.882
Toxicology Reports	1	4.807
Toxicological Sciences	1	4.849
Toxicology Letters	6	4.372
Publications	89	
Cumulative impact factor of papers	443.867	
Weighted Impact Factor	4.99	
References	2844	
h-index	28	
i10-index	48	

Annexes

Annex 1: List of publications in peer-reviewed journals

1. Barouki, R., Audouze, K., Becker, C., Blaha, L., Coumoul, X., Karakitsios, S., Klanova, J., Miller, G. W., Price, E. J., Sarigiannis, D., 2021. The Exposome and Toxicology: A Win–Win Collaboration. Toxicological Sciences, https://doi.org/10.1093/toxsci/kfab149.

2. Novak, R., Petridis, I., Kocman, D., Robinson, J. A., Kanduč, T., Chapizanis, D., Karakitsios, S., Flückiger, B., Vienneau, D., Mikeš, O., Degrendele, C., Sáňka, O., García Dos Santos-Alves, S., Maggos, T., Pardali, D., Stamatelopoulou, A., Saraga, D., Persico, M. G., Visave, J., Gotti, A., Sarigiannis, D., 2021. Harmonization and Visualization of Data from a Transnational Multi-Sensor Personal Exposure Campaign. International Journal of Environmental Research and Public Health. 18, 11614.

3. Robinson, J. A., Novak, R., Kanduč, T., Maggos, T., Pardali, D., Stamatelopoulou, A., Saraga, D., Vienneau, D., Flückiger, B., Mikeš, O., Degrendele, C., Sáňka, O., García Dos Santos, S., Visave, J., Gotti, A., Persico, M. G., Chapizanis, D., Petridis, I., Karakitsios, S., Sarigiannis, D. A., Kocman, D., 2021. User-Centred Design of a Final Results Report for Participants in Multi-Sensor Personal Air Pollution Exposure Monitoring Campaigns. International Journal of Environmental Research and Public Health. 18, 12544.

4. Kouroutzi, M., Stratidakis, A., Kermenidou, M., Karakitsios, S., Sarigiannis, D., 2021. Application of TiO2 Nanoparticles in Clay Roofing Tiles as a Photocatalytic Active Material. Materials Proceedings. 5, 90.

5. Mueller, W., Wilkinson, P., Milner, J., Vardoulakis, S., Steinle, S., Pärkkä, J., Parmes, E., Cluitmans, L., Kuijpers, E., Pronk, A., Sarigiannis, D., Karakitsios, S., Chapizanis, D., Maggos, T., Stamatelopoulou, A., Loh, M., 2021. Neighbourhood and path-based greenspace in three European countries: associations with objective physical activity. BMC Public Health. 21, 282.

6. Saraga, D., Maggos, T., Degrendele, C., Klánová, J., Horvat, M., Kocman, D., Kanduč, T., Garcia, S., Peteira, R. F., Gómez, P. M., Manousakas, M., Bairachtari, K., Eleftheriadis, K., Kermenidou, M., Karakitsios, S., Gotti, A., Sarigiannis, D. Multi-city comparative PM2.5 source apportionment for fifteen sites in Europe: The ICARUS project. Science of The Total Environment (2021) 751:141855.

7. Barouki R, Kogevinas M, Audouze K, Belesova K, Bergman A, Birnbaum L, Boekhold S, Denys S, Desseille C, Drakvik E, Frumkin H, Garric J, Destoumieux-Garzon D, Haines A, Huss A, Jensen G, Karakitsios S, Klanova J, Koskela IM, Laden F, Marano F, Franziska Matthies-Wiesler E, Morris G, Nowacki J, Paloniemi R, Pearce N, Peters A, Rekola A, Sarigiannis D, Šebková K, Slama R, Staatsen B, Tonne C, Vermeulen R, Vineis P. The COVID-19 pandemic and global environmental change: Emerging research needs. Environment International (2021) 146:106272.

8. Mueller W, Wilkinson P, Milner J, Vardoulakis S, Steinle S, Pärkkä J, Parmes E, Cluitmans L, Kuijpers E, Pronk A, Sarigiannis D, Karakitsios S, Chapizanis D, Maggos T, Stamatelopoulou A, Loh M. Neighbourhood and path-based greenspace in three European countries: associations with objective physical activity. BMC Public Health (2021) 21:282.

9. Papaioannou N., Distel E., Oliveira E.,Catherine E., Gabriel C., Frydas I., Anesti O., Attignon E., Aggerbeck M., Horvat M., Barouki R., Sarigiannis D., Karakitsios S. Multi-omics analysis reveals that co-exposure to phthalates and 1 metals disturbs urea cycle and choline metabolism. Environmental Research (2020), in press.

10. Sarigiannis D., Papaioannou N., Handakas E., Anesti O., Polanska K., Hanke W.., Salifoglou A, Gabriel C., Karakitsios S. Neurodevelopmental exposome: the effect of in utero co-exposure to heavy metals and phthalates on child neurodevelopment. Environmental Research (2020), in press.

11. Kermenidou M., Karakitsios S., Sarigiannis D. Sources of oxidative stress induced by ambient air PMx. Environmental Research. (2020), in press.

12. Sarigiannis D., Chapizanis D., Petridis I., Kougioumtzoglou A., Kermenidou M., Sarigiannis G., Gotti A., Karakitsios S. Refining PM exposure using low-cost portable 2 sensor data and human respiratory tract 3 deposition modelling. Journal of Exposure Science and Environmental Epidemiology. (2020), in press.

13. Anesti O., Papaioannou N., Gabrie C., Dzhedzheia V., Petridis I., Dickinson M., Horvat M., Snoj Tratnik J., Tsatsakis A., Karakitsios S., Sarigiannis A. An exposome connectivity paradigm for the mechanistic

assessment of the effects of prenatal and early life exposure to metals on neurodevelopment. Frontiers in Public HEALTH (2020), in press.

14. Chapizanis D., Karakitsios S., Gotti A., Sarigiannis D. Assessing personal exposure using Agent Based Modelling informed by sensors technology. Environmental Research (2020), in press.

15. Sarigiannis D., Handakas E. J., Karakitsios S, Gotti A. Life cycle assessment of municipal waste management options. Environmental Research (2020), in press.

16. Papadaki K., Karakitsios S., Sarigiannis D. Modeling of the total elimination half life for environmental chemicals. Environmental Research (2020), in press.

17. Karakitsios, S., Busker, R., Tjärnhage, T., Armand, P., Dybwad, M., Nielsen, M.F., Burman, J., Burke, J., Brinek, J., Bartzis, J., Maggos, T., Theocharidou, M., Gattinesi, P., Giannopoulos, G. and Sarigiannis, D. (2020) Challenges on detection, identification and monitoring of indoor airborne chemical-biological agents, Safety Science, 129, 104789.

18. Audouze, K., Sarigiannis, D., Alonso-Magdalena, P., Brochot, C., Casas, M., Vrijheid, M., Babin, P. J., Karakitsios, S., Coumoul, X., Barouki, R. Integrative Strategy of Testing Systems for Identification of Endocrine Disruptors Inducing Metabolic Disorders—An Introduction to the OBERON Project. International Journal of Molecular Sciences (2020), 21, 2988. doi:10.3390/ijms21082988.

19. Sarigiannis, D.A., Gotti, A., Handakas, E., Karakitsios, S. Development of a generic lifelong Physiology Based Biokinetic model for exposome studies. Environmental Research (2020) 109307, https://doi.org/10.1016/j.envres.2020.109307.

20. Sillé, F.C.M., Karakitsios, S., Kleensang, A., Koehler, K., Maertens, A., Miller, G.W., Prasse, C., Quiros-Alcala, L., Ramachandran, G., Rappaport, S.M., Rule, A.M., Sarigiannis, D., Smirnova, L., Hartung, T. The exposome – a new approach for risk assessment. ALTEX – Alternatives to animal experimentation (2020) 37(1), 003-023.

21. Mueller, W., Steinle, S., Pärkkä, J., Parmes, E., Liedes, H., Kuijpers, E., Pronk, A., Sarigiannis, D., Karakitsios, S., Chapizanis, D., Maggos, T., Stamatelopoulou, A., Wilkinson, P., Milner, J., Vardoulakis, S., Loh, M. Urban greenspace and the indoor environment: Pathways to health via indoor particulate matter, noise, and road noise annoyance. Environmental Research (2020), 180:158850.

22. Leblanc, A.F., Attignon, E.A., Distel, E., Karakitsios, S.P., Sarigiannis, D.A., Bortoli, S., Barouki, R., Coumoul, X., Aggerbeck, M., Blanc, E.B. A dual mixture of persistent organic pollutants modifies carbohydrate metabolism in the human hepatic cell line HepaRG. Environmental Research (2019). doi.org/10.1016/j.envres.2019.108628.

23. Rezaee, R., Sheidary, A., Jangjoo, S., Ekhtiary, S., Bagheri, S., Dadres, M., Docea, A.O., Tsarouhas, K., Sarigiannis, D.A., Karakitsios, S., Tsatsakis, A., Kovatsi, L., Hashemzaei, M. Cardioprotective effects of hesperidin in carbon monoxide-poisoned rats. Drug and Chemical Toxicology (2019), Taylor & Francis, doi.org/10.1080/01480545.2019.1650753.

24. Sarigiannis, D.A., Karakitsios, S., Dominguez-Romero, E., Papadaki, K., Brochot, C., Kumar, V., Schumacher, M., Sy, M., Mielke, H., Greiner, M., Mengelers, M., Scheringer, M. Physiology-based toxicokinetic modeling in the frame of the European Human Biomonitoring Initiative. Environmental Research (2019), 172, 216-230, Academic Press.

25. Sarigiannis D.A., Karakitsios S. Advancing chemical risk assessment through human physiology-based biochemical process modeling. Fluids (2019) 4(1), 4; doi:10.3390/fluids4010004.

26. Sarigiannis D.A., Snoj Tratnik J., Mazej D., Kosjek T., Heath E., Horvat M., Anesti O., Karakitsios S.P. Risk characterization of bisphenol-A in the Slovenian population starting from human biomonitoring data. Environmental Research (2019) 170: 293-300.

27. Tratnik, JS, Kosjek, T, Heath, E, Mazej, D, Ćehić, S, Karakitsios, SP, Sarigiannis, DA, Horvat, M. Urinary bisphenol A in children, mothers and fathers from Slovenia: Overall results and determinants of exposure. Environmental research (2019) 168: 32-40.

28. Sarigiannis D, Karakitsios S. Addressing complexity of health impact assessment in industrially contaminated sites via the exposome paradigm. Epidemiologia & Prevenzione (2018) in press.

29. Hoek G, Alimehmeti I, Candeias C, Pérez Carrascosa FM, Colles A, Crişan GC, DackS , Demeter Z, Fazzo L, Flueckiger B, Gaengler S, Hough R, Iantovics BL, Sarigiannis D, Karakitsios S, Kalantzi OI, Makris K,

Martin-Olmedo P, Nechita E, Nicoli T, Passetto R, Ranzi A, Tsadilas C, Tasic V, Vaccari L, Iavarone I, Hoogh DH. A review of exposure assessment methods for epidemiological studies of health effects related to Industrially Contaminated sites. Epidemiologia & Prevenzione (2018) in press.

30. Limban C, Nuţă DC, Chiriţă C, Negreş S, Arsene AL, Goumenou M, Karakitsios SP, Tsatsakis AM, Sarigiannis DA. The use of structural alerts to avoid the toxicity of pharmaceuticals. Toxicology Reports (2018), in press.

31. Stamatelopoulou A, Chapizanis D, Karakitsios S, Kontoroupis P, Asimakopoulos DN, Maggos T, Sarigiannis D. Assessing and Enhancing the Utility of Low-Cost Activity and Location Sensors for Exposure Studies. Environmental Monitoring and Assessment (2018), 190:155.

32. Steckling N, Gotti A, Bose-O'Reilly S, Chapizanis D, Costopoulou D, De Vocht F, Garí M, Grimalt J, Heath E, Hiscock R, Jagodic M, Karakitsios SP, Kedikoglou K, Kosjek T, Leondiadis L, Maggos T, Mazej D, Polańska K, Povey A, Rovira J, Schoierer J, Schuhmacher M, Špirić Z, Stajnko A, Stierum R, Tratnik JS, Vassiliadou I, Annesi-Maesano I, Horvat M, Sarigiannis DA. Biomarkers of exposure in environment-wide association studies - Opportunities to decode the exposome using human biomonitoring data. Environmental Research (2018) 164:597-624.

33. Papadaki K, Karakitsios S, Sarigiannis DA. Modeling of adipose/blood partition coefficient for environmental chemicals. Food and Chemical Toxicology (2017) 110:274-285.

34. Sarigiannis DA, Handakas EJ, Kermenidou M, Zarkadas I, Gotti A, Charisiadis P, Makris K, Manousakas M, Eleftheriadis K, Karakitsios SP. Monitoring of air pollution levels related to Charilaos Trikoupis Bridge. Science of The Total Environment 2017; 609: 1451-1463.

35. Pino A, Chiarotti F, Calamandrei G, Gotti A, Karakitsios S, Handakas E, Bocca B, Sarigiannis D, Alimonti A. Human biomonitoring data analysis for metals in an Italian adolescents cohort: an exposome approach. Environmental Research (2017) doi:10.1016/j.envres.2017.08.012).

36. Sarigiannis D, K. Papadaki, Kontoroupis P, Karakitsios S. Development of QSARs for parameterizing Physiology Based ToxicoKinetic models. Food and Chemical Toxicology 2017, Food and Chemical Toxicology 2017; 106, Part A: 114-124.

37. Loh M, Sarigiannis D, Gotti A, Karakitsios S, Pronk A, Kuijpers E, Annessi-Maesano I, Baiz N, Madureira J, Oliveira Fernandes E, Jerrett M, Cherrie J. A Sensor-based Approach to Characterise the External Exposome. International Journal of Environmental Research and Public Health 2017; 14:434; doi:10.3390/ijerph14040434.

38. Manrai AK, Cui Y, Bushel PR, Hall M, Karakitsios S, Mattingly C, Ritchie M, Schmitt C, Sarigiannis DA, Thomas DC, Wishart D, Balshaw DM, Patel CJ. Informatics and Data Analytics to Support Exposome-Based Discovery for Public Health. Annual Review of Public Health 2017; doi: 10.1146/annurev-publhealth-082516-012737.

39. Priftis A, Papikinos K, Koukoulanaki M, Kerasioti E, Stagos D, Konstantinopoulos K, Spandidos DA, Kermenidou M, Karakitsios S, Sarigiannis D, Tsatsakis AM, Kouretas D. Development of an assay to assess genotoxicity by particulate matter extract. Mol Med Rep 2017; 15: 1738-1746.

40. Sarigiannis, D., Kyriakou, S., Kermenidou, M., Karakitsios, S. The reactive oxidative potential from biomass emitted particulate matter (PM10, PM2.5 & PM1) and its impact on human health. Fresenius Environmental Bulletin (2017) 26(1): 188-195.

41. Handakas, E., Chapizanis, D., Sarigiannis, D., Karakitsios, S. Study of in-vehicle particulate matter exposure in Thessaloniki, Greece. Fresenius Environmental Bulletin (2017) 26(1): 327-331.

42. Sarigiannis DA, Kontoroupis P, Nikolaki S, Gotti A, Chapizanis D, Karakitsios S. Benefits on public health from transport-related greenhouse gas mitigation policies in Southeastern European cities. Sci Total Environ 2017; 579: 1427-1438.

43. Sarigiannis D, Karakitsios S, Handakas E, Simou K, Solomou E, Gotti A. Integrated exposure and risk characterization of bisphenol-A in Europe. Food and Chemical Toxicology 2016; 98: 134-147.

44. Vitkina TI, Yankova VI, Gvozdenko TA, Kuznetsov VL, Krasnikov DV, Nazarenko AV, Chaika VV, Smagin SV, Tsatsakis AM, Engin AB, Karakitsios SP, Sarigiannis DA, Golokhvast KS. The impact of multi-walled carbon nanotubes with different amount of metallic impurities on immunometabolic parameters in healthy volunteers. Food and Chemical Toxicology 2016; 87: 138-147.

45. Sarigiannis D, Karakitsios S, Gotti A, Handakas E, Papadaki K. The exposome and Health Impact Assessment. 2016; doi: http://dx.doi.org/10.1093/eurpub/ckw172.048.

46. Sabel CE, Hiscock R, Asikainen A, Bi J, Depledge M, van den Elshout S, Friedrich R, Huang G, Hurley F, Jantunen M, Karakitsios SP, Keuken M, Kingham S, Kontoroupis P, Kuenzli N, Liu M, Martuzzi M, Morton K, Mudu P, Niittynen M, Perez L, Sarigiannis D, Stahl-Timmins W, Tobollik M, Tuomisto J, Willers S. Public health impacts of city policies to reduce climate change: findings from the URGENCHE EU-China project. Environmental Health 2016; 15: 5-21.

47. Sarigiannis, D., Papadaki, K., Karakitsios, S. Development and evaluation of QSAR models for use in toxicokinetic modelling of "data poor" industrial chemicals. Toxicology Letters (2016) 258, S296.

48. Sarigiannis, D., Karakitsios, S., Handakas, E., Gotti, A. Exposome analysis of polyaromatic hydrocarbons. Toxicology Letters (2016) 258, S57.

49. Sarigiannis, D., Karakitsios, S., Tsatsakis, A., Golokhvast, K., Engin, B. High dimension biological analysis of carbon nanotube toxicity. Toxicology Letters (2016) 258, S269.

50. Sarigiannis DA, Karakitsios SP, Zikopoulos D, Nikolaki S, Kermenidou M. Lung cancer risk from PAHs emitted from biomass combustion. Environmental Research 2015; 137: 147-156.

51. Sarigiannis DA, Karakitsios SP, Kermenidou MV. Health impact and monetary cost of exposure to particulate matter emitted from biomass burning in large cities. Science of The Total Environment 2015; 524–525: 319-330.

52. Sarigiannis DA, Kermenidou M, Nikolaki S, Zikopoulos D, Karakitsios SP. Mortality and Morbidity Attributed to Aerosol and Gaseous Emissions from Biomass Use for Space Heating. Aerosol and Air Quality Research 2015; 15: 2496-2507.

53. Sarigiannis D, Papadaki K, Kontoroupis P, Karakitsios S. Advanced QSAR models for use in toxicokinetic modelling. Toxicology Letters 2015; 238: S166-S167.

54. Sarigiannis D, Karakitsios S, Gotti A, Handakas E, Papadaki K. INTEGRA: Advancing risk assessment using internal dosimetry metrics. Toxicology Letters 2015; 238: S110-S111.

55. Golokhvast KS, Chernyshev VV, Chaika VV, Ugay SM, Zelinskaya EV, Tsatsakis AM, Karakitsios SP, Sarigiannis DA. Size-segregated emissions and metal content of vehicle-emitted particles as a function of mileage: Implications to population exposure. Environmental Research 2015; 142: 479-485.

56. Andra SS, Charisiadis P, Karakitsios S, Sarigiannis DA, Makris KC. Passive exposures of children to volatile trihalomethanes during domestic cleaning activities of their parents. Environ Res 2015; 136: 187-95.

57. Alegakis A, Androutsopoulos V, Karakitsios S, Sarigiannis D. Modelling risk for chemical mixtures. Toxicology Letters 2015; 238: S19.

58. Sarigiannis D, Karakitsios S, Kermenidou M, Nikolaki S, Zikopoulos D, Semelidis S, Papagiannakis A, Tzimou R. Total exposure to airborne particulate matter in cities: The effect of biomass combustion. Science of the Total Environment 2014; 493: 795-805.

59. Karakitsios S, Asikainen A, Garden C, Semple S, Brouwere KD, Galea KS, Sánchez-Jiménez A, Gotti A, Jantunen M, Sarigiannis D. Integrated exposure for risk assessment in indoor environments based on a review of concentration data on airborne chemical pollutants in domestic environments in Europe. Indoor and Built Environment 2014; 24: 1110-1146.

60. Karakitsios SP, Sarigiannis DA, Gotti A, Kassomenos PA, Pilidis GA. A methodological frame for assessing benzene induced leukemia risk mitigation due to policy measures. Science of the Total Environment 2013; 443: 549-558.

61. Sarigiannis DA, Karakitsios SP, Gotti A. Exposure and risk characterization in European indoor environments related to benzene and formaldehyde. Fresenius Environmental Bulletin 2012; 21: 3160-3167.

62. Sarigiannis DA, Karakitsios SP, Antonakopoulou MP, Gotti A. Exposure analysis of accidental release of mercury from compact fluorescent lamps (CFLs). Science of the Total Environment 2012; 435–436: 306-315.

63. Sarigiannis D, Samaras Z, Vouitsis I, Karakitsios S, Kalaitzis V. Mechanistic Exposure Assessment of Ultrafine PM. Epidemiology 2012; 23.

64. Sarigiannis D, Karakitsios S, Gotti A. Tags: A Computational Tool Towards Tiered Aggregate Exposure Assessment. Epidemiology 2012; 23.

65. Sarigiannis D, Gotti A, Karakitsios S, Kontoroupis P, Nikolaki S. P-234: Intera Platform: A Tool for Mechanistic Risk Assessment of Indoor Air Pollutants. Epidemiology 2012; 23.

66. Vlachogianni A, Kassomenos P, Karppinen A, Karakitsios S, Kukkonen J. Evaluation of a multiple regression model for the forecasting of the concentrations of NOx and PM10 in Athens and Helsinki. Science of the Total Environment 2011; 409: 1559-1571.

67. Sarigiannis DA, Karakitsios SP, Gotti A, Liakos IL, Katsoyiannis A. Exposure to major volatile organic compounds and carbonyls in European indoor environments and associated health risk. Environment International 2011a; 37: 743-765.

68. Sarigiannis D, Karakitsios S. Perinatal Exposure to Bisphenol A: The Route of Administration Makes the Dose. Epidemiology 2011; 22: S172.

69. Sarigiannis D, Gotti A, Karakitsios S. A Computational Framework for Aggregate and Cumulative Exposure Assessment. Epidemiology 2011b; 22: S96-S97.

70. Paschalidou A, Karakitsios S, Kleanthous S, Kassomenos P. Forecasting hourly PM10 concentration in Cyprus through artificial neural networks and multiple regression models: Implications to local environmental management. Environmental Science and Pollution Research 2011; 18: 316-327.

71. Kassomenos P, Petrakis M, Sarigiannis D, Gotti A, Karakitsios S. Identifying the contribution of physical and chemical stressors to the daily number of hospital admissions implementing an artificial neural network model. Air Quality, Atmosphere and Health 2011: 1-10.

72. Kassomenos P, Vardoulakis S, Borge R, Lumbreras J, Papaloukas C, Karakitsios S. Comparison of statistical clustering techniques for the classification of modelled atmospheric trajectories. Theoretical and Applied Climatology 2010; 102: 1-12.

73. Karakitsios SP, Kassomenos PA, Sarigiannis DA, Pilidis GA. Exposure modeling of benzene exploiting passive-active sampling data. Environmental Modeling and Assessment 2010; 15: 283-294.

74. Sarigiannis DA, Karakitsios SP, Gotti A, Papaloukas CL, Kassomenos PA, Pilidis GA. Bayesian algorithm implementation in a real time exposure assessment model on benzene with calculation of associated cancer risks. Sensors 2009; 9: 731-755.

75. Sarigiannis D, Karakitsios S, Gotti A. Mechanistic Full Chain Approach for ETS Carcinogenicity Impact Assessment in the EU. Epidemiology 2009; 20: S88.

76. Pilidis GA, Karakitsios SP, Kassomenos PA, Kazos EA, Stalikas CD. Measurements of benzene and formaldehyde in a medium sized urban environment. Indoor/outdoor health risk implications on special population groups. Environ Monit Assess 2009; 150: 285-94.

77. Kassomenos P, Karakitsios S, Pilidis G. Daily variation of traffic emissions in Athens, Greece. International Journal of Environment and Pollution 2009; 36: 324-335.

78. Kassomenos P, Papaloukas C, Petrakis M, Karakitsios S. Assessment and prediction of short term hospital admissions: the case of Athens, Greece. Atmospheric Environment 2008; 42: 7078-7086.

79. Kassomenos P, Karayannis A, Panagopoulos I, Karakitsios S, Petrakis M. Modelling the dispersion of a toxic substance at a workplace. Environmental Modelling and Software 2008; 23: 82-89.

80. Karakitsios S, Sarigiannis D, Gotti A, Kassomenos P, Pilidis G. An Integrated Exposure and Risk Model for Benzene in the Ambient Air. Epidemiology 2008; 19: S356.

81. Karakitsios SP, Papaloukas CL, Kassomenos PA, Pilidis GA. Assessment and prediction of exposure to benzene of filling station employees. Atmospheric Environment 2007; 41: 9555-9569.

82. Karakitsios SP, Delis VK, Kassomenos PA, Pilidis GA. Contribution to ambient benzene concentrations in the vicinity of petrol stations: Estimation of the associated health risk. Atmospheric Environment 2007; 41: 1889-1902.

83. Kassomenos P, Karakitsios S, Pilidis G. Assessment and prediction of benzene concentrations in a street canyon using a variety of models, in the means of environmental management purposes. Global NEST Journal 2006; 8: 265-271.

84. Kassomenos P, Karakitsios S, Papaloukas C. Estimation of daily traffic emissions in a South-European urban agglomeration during a workday. Evaluation of several "what if" scenarios. Sci Total Environ 2006; 370: 480-90.

85. Karakitsios SP, Hadjidakis I, Kassomenos PA, Pilidis GA. Development of an artificial neural network to predict benzene concentrations in a street canyon. Fresenius Environmental Bulletin 2006; 15: 424-430.

86. Karakitsios S, Papaloukas C, Kassomenos P, Pilidis G. Assessment and prediction of benzene concentrations in a street canyon using artificial neural networks and deterministic models: Their response to "what if" scenarios. Ecological Modelling 2006; 193: 253-270.

87. Pilidis GA, Karakitsios SP, Kassomenos PA. BTX measurements in a medium-sized European city. Atmospheric Environment 2005; 39: 6051-6065.

88. Kassomenos PA, Karakitsios SP, Pilidis GA. A methodology to estimate benzene concentrations in a town through a traffic model. Sci Total Environ 2005; 347: 272-81.

89. Kassomenos PA, Karakitsios SP, Pilidis GA. A simple semi-empirical approach to modeling benzene concentrations in a street canyon. Atmospheric Environment 2004; 38: 6073-6078.

Annex 2: Book chapters

1. Sarigiannis D.A., Hartung T., S. Karakitsios. The exposome - a new paradigm for non-animal toxicology and integrated risk assessment. Chapter in: Toxicological risk assessment and multi-system health impacts from exposure. A. Tsatsakis (eds.), Elsevier (2021).
2. Sarigiannis D.A., S. Karakitsios, E. Handakas, K. Papadaki, D. Chapizanis, A. Gotti. Informatics and data analytics to support exposome-based discovery Part 1: Assessment of external and internal exposure. Chapter in: Applying Big Data Analytics in Bioinformatics and Medicine. P. Papadopoulou and D. Lytras (eds.), IGI Global (in print).
3. Sarigiannis D.A., A. Gotti, E. Handakas, S. Karakitsios. Informatics and data analytics to support exposome-based discovery Part 2: Computational exposure biology. Chapter in: Applying Big Data Analytics in Bioinformatics and Medicine. P. Papadopoulou and D. Lytras (eds.), IGI Global (in print).
4. Sarigiannis D.A. and Karakitsios S.P. Complex exposure modeling. Chapter in: Mixtures toxicology and risk assessment. J.E. Simmons and C. Rider (eds.), Springer (2017).
5. Karakitsios S., Sarigiannis D., Gotti A. Benzene and its Derivatives: New Uses and Impacts on Environment and Human Health. Chapter: Refining exposure and health risk assessment of benzene, pp. 245-295. NOVA Publishers, ISBN: 978-1-62100-026-6 (2012).
6. Kassomenos P., Pilidis G., Papaloukas C., Karakitsios S. Parameters Controlling Ambient Air Benzene Concentrations and Human Exposure in a Medium Sized Southeastern European City; pp. 243-305. Chapter in: Air Quality: New Research, ISBN: 978-1-60876-586-7 (2008).

Annex 3: List of contribution to scientific projects

1. **PARC - Partnership for Risk Assessment (HORIZON EUROPE) - - Budget: 400,000,000 € / (2022 – 2029) (Deputy Leader of the WP for Concepts and tools and of the Greek National Hub)**

The purpose of the Partnership is to drive innovation in chemical risk assessment and thereby enable the sustainable use and management of chemicals whilst protecting human health and the environment and contributing to a non-toxic environment by:

a) strengthening the scientific basis for chemical risk assessment in the EU, by bringing risk assessors and managers together with scientists to accelerate method development, the generation of necessary data and knowledge, and

b) facilitating the transition to next generation evidence-based risk assessment. Political agendas around the world are committed to address the UN Sustainable Development Goals (SDGs). Given that

chemicals and waste affect all aspects of sustainable development, the sound management of chemicals and waste is essential and supports the implementation of many, if not all, SDGs.

This Partnership will also contribute with data generation, analysis and management approaches to support the European Strategy for Data21, in particular through its contribution to the Common European Green Deal data space that aims to use the major potential of data in support of the Green Deal priority actions such as the zero-pollution strategy. The Partnership will focus on addressing priority knowledge gaps for evidence-based chemical risk assessment, as identified by risk assessors and risk managers, and where research and innovation (R&I) activities bring added value.

2. URBANOME (HORIZON 2020) - Urban observatory for multi-participatory enhancement of health and wellbeing - - Budget: 4,974,015 € / (Deputy Coordinator) (2021 – 2024)

URBANOME aims at building a common EU Framework for evaluating comprehensively multi-sector policies in urban settings supporting the "Health in all Policies" approach of WHO. In this light the overall objective of URBANOME is to promote urban health, wellbeing and liveability, through systematically integrating health concerns in urban policies and the activities of urban citizens, on the basis of detailed and comprehensive evidence on environmental health determinants, the spatial distribution of these in the city, and the social distribution of their impact among different population groups, accounting for different life styles and behaviours. Integration of health concerns, environmental stressors and social equality in public and private activities help alleviate a wide range of contemporary urban challenges, specifically social cohesion and health inequality, and promote the transition of European cities to sustainable, climate proof, smart and inclusive urban economies. URBANOME brings together the complete set of environmental, social, and functional features of a city in an integrative analytical framework that would facilitate the identification of the main determinants of urban health and wellbeing and support co-creation and testing of policies and precision interventions designed to improve urban health and wellbeing through Urban Living Labs.

3. HERA - HERA – Health Environment Research Agenda (HORIZON 2020) - - Budget 2,500,000 € / (2019 – 2021)

The overall aim of the HERA project is to set the priorities for an environment and health research agenda in the EU by adopting a holistic, systemic and inclusive approach in the face of global environmental changes. Research is expected to support decision-making at all levels and to help attaining the ultimate goals of protecting and improving ecosystem quality and human health. The HERA strategy will be based on a shared vision of the best knowledge on environment and health (EH) interactions that we wish to have by 2030, the most efficient and realistic way to achieve such knowledge and to translate it for the benefits of the EU citizens. Better knowledge and evidence are needed on ecosystem-health interactions, prevention and resilience mechanisms and, the best methods and tools to estimate health impact and the related costs, implement and monitor policies and decisions. The shared HERA vision will aim to identify both the environmental opportunities for health improvements, and the major environmental problems and challenges that need to be addressed. Such an ambitious objective will only be possible through a close and continuous interactions with the numerous and diverse stakeholders that are particularly concerned by these issues.

4. OBERON - An integrative strategy of testing systems for identification of EDs related to metabolic disorders - - Budget 6,500,000 € / (PI) (2019 – 2023)

The OBERON project will build an integrated testing strategy (ITS) to detect EDs-related metabolic disorders by developing, improving and validating a battery of test systems. It will be based on the concept of an integrated approach for testing and assessment (IATA). OBERON will combine 1) experimental methods (in vitro e.g. on 2D and 3D human-derived cells and tissues, and in vivo i.e. in zebrafish at different stages), 2) high throughput omics technologies, 3) epidemiology and human

biomonitoring studies and 4) advanced computational models (in silico and systems biology) on functional endpoints related to metabolism. Such interdisciplinary framework will help at deciphering EDs based on mechanistic understanding of toxicity by providing and making available more effective alternative test methods relevant for human health that are in line with regulatory needs. Data generated in OBERON will also allow the development of novel Adverse Outcome Pathways (AOPs). The assays will be pre-validated in order to select the test systems that will show acceptable performance in terms of relevance for the second step of the validation process, i.e. the inter-laboratory validation as ring tests. Therefore, the aim of the OBERON project is to support the OECD conceptual framework for testing and assessment of EDs by developing specific assays not covered by the current tests, and to propose an IATA approach for ED-related metabolic disorders detection, which will be submitted to the JRC and OECD community.

5. NEUROSOME - Exploring the neurological exposome (Marie Sklodowska-Curie Innovative Training Networks) - - Budget 3,493,845€ / (2017 – 2021)

The main objective of NEUROSOME is to develop an integrative biology-based framework starting from human biomonitoring data to unravel causal associations among the genetic predisposition, cumulative exposure to multiple environmental chemicals and neurological disorders. The project brings together beyond- the-state-of-the-art advances in human biomonitoring and systems biology, exposure monitoring and toxicological testing technologies and advanced tools for computational analyses of the exposure-to-health effect continuum following an exposome paradigm. The NEUROSOME methodology will be applied in population studies across different exposure settings to neurotoxicants (metals and persistent organics) in Europe. This will improve scientific knowledge on cause andeffect relations between environmental stressors and neurodevelopmental disorders taking into account exposure and health effect modification due to intrinsic (e.g. genetic susceptibility) and extrinsic (e.g. diet and socioeconomicstatus) factors. New standards for human biomonitoring data interpretation in conjunction with environmental and exposure information will be developed for ready use in chemical mixture risk assessment. The training goal is to produce a new generation of exposome researchers, trained in academia, applied research and industry, with transdisciplinary skills (environmental end exposure modelling, human biomonitoring, -omics technologies, high dimensional bioinformatics and environmental epidemiology,) and understanding of fundamental science and its direct application to environmental health challenges. To this aim NEUROSOME will focus on the provision of trans-disciplinary research training to young researchers through a combination of network-wide training programs and individual personalised training-through-research projects to deliver to the EU and the world a new cohort of researchers trained in cutting edge transdisciplinary environmental health sciences.

6. DOREMI (DOse Response of MIxtures) (CEFIC LRI) - - Budget 100,000 € / (2018 – 2020)

The DOREMI study (DOse Response of MIxtures) proposes the development of a framework for the incorporation of exposure biology that combines human biomarkers and laboratory experiments into cell cultures to identify and characterize neurodevelopmental disturbance pathways. The purpose of the study is to understand the mechanism by which the combined exposure to chemical mixtures to which we daily come into contact in our everyday life, including potential neurotoxic substances such as heavy metals (mainly lead, mercury, cadmium and arsenic) and plasticizers (such as phthalates esters and phenols). A more specific goal of the study is to extract dose / response levels of the combined exposure of these compounds to children's neurodevelopment. Towards this aim, multi-omics analysis will be applied in both cohort biosamples and *in vitro* extracts towards the identification of the molecular mechanisms that associate co-exposure to plasticisers and heavy metals to neurodevelopmental disorders.

7. HBM4EU Human Biomonitoring Initiative (Horizon 2020) - - Budget 70,000,000 € / (2017 – 2021)

The European Human Biomonitoring Initiative (EHBMI) will establish and implement an ambitious European Joint Programme (EJP) and will provide policy makers with comparable and validated chemical exposure and health data at EU level. This will be done by integrating and building on previous and ongoing EU initiatives, national HBM programmes and studies (including cohorts, epidemiological studies and health surveys).

In contrast to former projects, the proposed programme will involve national programme owners and/or the national managers of those programmes, and include policy makers at national level. This inclusive approach, combined with the integration of HBM and environmental health research, will strengthen the EJP, enhance the sustainability of the initiative and amplify the impacts of the results.

In order to ensure that the knowledge we generate is targeted, timely and fit for purpose, we will establish a sustained dialogue with EU policy makers responsible for assessing and managing the risks to human health from chemical exposure via the environment, diet, consumer products and occupational exposure. Through effective communication and dissemination to policy makers, we will actively promote the exploitation of our results by policy makers in such a way as to impact positively on human health.

8. GRIN - GReen INfrastructures for disaster risk reduction protection: evidence, policy instruments and marketability – (DG ECHO) - - Budget: 681,153 €

The damage and losses caused by natural hazards in Europe over the period 1980-2013 amounted to 480 billion Euros in 2013 prices. More than 80% of the losses, 393 billion Euros, were caused by extreme weather events (i.e., on average 11.6 billion Euros per year). Without concerted action and long-term adaptation planning, future risks are likely to be amplified by ongoing human-induced climate change and socio-economic change. To improve the resilience of society, both structural and non-structural measures and grey and green infrastructure will be needed. In particular, a greater deployment of nature-based solutions such as green infrastructures (GIs) is being increasingly advocated by European institutions NGO's, governments and financing bodies as a part of flexible, effective and efficient, and no-regret measures for disaster risk reduction and adaptation to climate change. Although there is plenty of research indicating the potential benefits of GI, demonstration of its practical value for DRR and role in both adaptation planning and sustainable development is lagging behind compared to other solutions and take up has been slow. This is primarily due to lack of actual applications, experience and coherence in the evidence base showing the direct and indirect benefits of GI solutions. In particular there is a lack of experience and coherence in implementation (including financing) and monitoring of GI solutions, including a lack of tools and methods supporting these processes. GREEN addresses these shortcomings and provides the necessary innovation in methods, tools, and solutions to appropriately promote the role of GI for DRR, climate change adaptation (CCA) and sustainable. In doing so, GREEN responds to the challenge transversally giving a proper value to ecosystem services will drive towards smart, sustainable and inclusive growth.

9. ICARUS Integrated Climate forcing and Air pollution Reduction in Urban Systems (HORIZON 2020) - - Budget: € 6,472,015 € / (2016 – 2019)

The ICARUS main objective is to develop integrated tools and strategies for urban impact assessment in support of air quality and climate change governance in EU Member States leading to the design and implementation of appropriate abatement strategies to improve the air quality and reduce the carbon footprint in European cities. We will develop detailed policies and measures for air pollution and climate control for the short and medium term (until ca. 2030). For the long term perspective (2050 and beyond) we will develop visions of green cities and explore pathways on how to start realizing these visions. The specific project objectives are to:

- quantitatively assess the impact of current and alternative national and local policies on reducing greenhouse gas (GHG) emissions and improving air quality through a full chain approach and evaluate the future public health and well-being impacts of these policies in European cities.

- evaluate (using source apportionment and atmospheric modelling) the current contributions of the different pollution sources linked to urban activities including heat and power use in the urban building stock, urban traffic and transportation needs, energy production, industrial activities including energy production, agriculture and trans-boundary pollution with respect to GHG-emissions, air quality loading, public health and well-being of the population.

- propose measures of technological (i.e. measures that will lead to a reduction of emissions at the source) and non-technological (i.e. measures that induce behavioural changes) nature to reduce both carbon footprint and air quality burden (win-win solutions). Techno-economic analysis of possible scenarios for the introduction of such measures will result in the definition of cost-effective environmental and climate protection and air quality management plans adapted to the specific needs of different EU cities and regions. The effect of these measures will be evaluated jointly taking into account the socioeconomic drivers related to the existing and projected scenarios.

10. BlueHealth - Linking Up Environment, Health and Climate for Inter-sector Health Promotion and Disease Prevention in a Rapidly Changing Environment (HORIZON 2020) - - Budget: € 5,998,671 €

The BlueHealth Consortium brings together a multi-disciplinary team of experts reaching across all 28 European Union countries and beyond. BlueHealth takes an international, interdisciplinary and multi-sector approach to health promotion and disease prevention by investigating interactions between EU's extensive 'blue infrastructure,' and the health and well-being of its citizens. Blue Infrastructure refers to the network of natural and man-made aquatic environments providing a range of multi-sectoral services (e.g. transportation, fresh water provision). There has been no prior systematic attempt to detail the potential impacts of our blue infrastructure on health promotion and disease (especially prevention relative to 21st Century public health challenges), nor to develop guidelines on how health should be considered when developing blue infrastructure interventions, particularly across sectors. BlueHealth will address this gap.

11. PEC - Post-Emergency, multi-hazard health risk assessment in Chemical Disasters (Civil Protection mechanism of the EC - DG Environment) - Budget: 788,803 €

A consolidated methodology for risk assessment of chemical mixtures and combined natural and technological NaTech hazards is currently not available. In this project an integrated multi-hazard risk assessment toolkit will be developed and the validity of this model will be evaluated on a case study (sample area) by considering the effects on plant structures and infrastructures of hypothetic natural and manmade disasters, such as earthquake, flood or terroristic attack leading to accidental release of large amounts of toxic chemicals into the environment. Immediate and long-term population health impacts of the toxic chemicals absorbed either individually of in combination will be determined and quantified according to (i) characteristics (type and intensity) of the initial disaster, (ii) degree of vulnerability of buildings and infrastructures, (iii) quantity of chemicals stored/handled in the plants, magnitude of their dispersion into the environment and levels of chemical contamination in the disaster area. The key receptors considered in simulations will include employees present in the affected plants during the incident, emergency responders, and the local population. A risk prioritisation matrix based upon damage level attainable in the infrastructures and potential public health risks will be developed to provide strategic risk information for public health planning.

12. HEALS - Health and Environment-wide Associations based on Large population Surveys (*7th FP - Large scale project*)- Budget: 14,866,648 €

HEALS is the largest multi-center project on the exposome in the world currently. Its overall aim is the refinement of an integrated methodology and the application of the corresponding analytical and

computational tools for performing environment-wide association studies (EWAS) in support of Europe-wide environment and health assessments.

HEALS is organized in a series of interlinked streams of activity focusing on the different aspects of individual assessment of exposure to conventional and emerging environmental stressors and on the prediction of the associated health outcomes. These streams bring together state-of-the-art advances in human biomonitoring and systems biology towards the development of an exposure biology paradigm, exposure monitoring technologies and advanced tools for computational analyses of the exposure-to-effect continuum. In fact, HEALS proposes the functional integration of -omics derived data and biochemical biomonitoring (high dimensional biology) to create the internal exposome at the individual level. These data will be exploited using advanced bioinformatics tools for both descriptive and predictive data mining. HEALS will propose a novel bioinformatics strategy focusing on biomarker fusion, and direct coupling of physiology-based biokinetic models to metabolic regulatory networks derived from -omics analyses. In this way, the internal dose of environmental stressors will be coupled to the alterations they bring about to gene expression, protein-protein interactions and metabolic regulation and plausible hypotheses on the respective pathways of toxicity can be established.

The main focus of the project is on susceptibility windows during growth (including pregnancy) and on vulnerable population such as young, elderly, socio-economically disadvantaged, gender and ethnic minorities. The overall approach will be verified and refined in a series of population studies across Europe including twin cohorts. The overall population size involved in these studies is up to ca. 335,000 individuals tackling different levels of environmental exposure, age windows of exposure, and socio-economic and genetic variability. The approach developed will be applied in a pilot environment and health examination survey of children including singletons and sets of twins with matched singletons covering ten EU Member States (the EXHES Study). The lessons learned will be translated into scientific advice towards the development of protocols and guidelines for the setting up of a European environment and health examination survey.

13. ERNCIP – European Reference Network for Critical Infrastructure Protection. Thematic Group "Detection of Indoor Airborne Chemical-Biological Agents" / Joint Research Center – European Commission

The overall aim this thematic group is to investigate issues that can be addressed in the EU level regarding Detection, Identification and Monitoring (DIM) of airborne, chemical and biological threats in enclosed spaces. Towards this aim, three main activities have been foreseen during the next 8 months for accomplishing the TG objectives. In order to evaluate the applicability of the current sensor technologies and what has to be done, it is critical to evaluate what are the actual needs that have to be addressed i.e. what do we expect from the sensors against CB threats in enclosed spaces. Thus, a critical starting point of the overall approach will be the definition of relevant scenarios of indoor airborne threats (chemical and biological) in critical infrastructures. The specific needs that have to be addressed will set up the criteria for performing a critical review on the existing sensors available in the EU and used either for chemical or for biological agents. Computational simulations will provide the spatial and temporal gradients contamination within indoor critical infrastructures. Finally, evaluation of capabilities of existing sensors based on the capability to perform early warning, will allow the TG to identify the gaps and to define requirements for next generation detectors in the EU.

14. CROME - Cross-Mediterranean Environment and Health Network (*LIFE+ European Commission/DG Environment*) - Budget: 1,760,190 €

CROME-LIFE aims to demonstrate a technically feasible integrated methodology for interpretation

of human biomonitoring data that will allow to quantitatively assess the impact on human health due to acute/chronic exposure to chemicals acting as neurodevelopmental and neurological toxicants and/or human carcinogens such as toxic and organic substances (PCB's and PBDEs, organochlorine and

organobromine compounds). The health endpoints investigated are cancer (for organic carcinogens such as PCBs) and neurotoxicity (for metals and organic compounds). The methodology applied will couple environmental monitoring data with human biomonitoring and epidemiological observations through the use of physiologically-based toxicokinetic (PBTK) and toxicodynamic (PBTD) models. These models would allow us to mechanistically associate the observed concentrations of contaminants in environmental media (air, water and soil) with human biomonitoring data already existing within the consortium and collected through targeted field campaigns. Via reverse modelling human exposure to the chemical substances will be reconstructed. These estimates will be used as indices of population exposure and of the environmental health burden due to the anthropogenic pollution in the project demonstration sites. The CROME-LIFE approach will aim at showing the feasibility of environment-wide association studies by interoperably linking environmental, biomonitoring and health status data. Causal associations between the observed health outcomes and the measured/estimated markers of exposure will be derived by means of advanced statistical models and causal diagrams. The CROME-LIFE methodology and tools will be applied in four countries in southern Europe (Greece, Slovenia, Italy and Spain) tackling different levels of environmental exposure, age windows of exposure, and socio-economic and genetic variability.

15. CheRRIE - Chemical and Radiological Risk in the Indoor Environment (*European Territorial Cooperation Programme Greece- Bulgaria 2007-2013 INTERREG IV*)- Budget: 1,420,569 €

CheRRIE aims at addressing the increase in respiratory health problems and allergies as well as lung/thyroid cancer incidence has been observed over the last fifteen years in South-eastern Europe including Central-South Bulgaria and Northern Greece. Much of this increase has been attributed to environmental hazards. The large amount (80%) of time the population spends indoors may have a compounding effect on this problem. This project performs a thorough assessment of the current chemical and radiological risks of building materials and will set up a comprehensive database of building material properties that would affect the respective attributable risk.Quantitative health impact related to the use of building materials will be quantitatively assessed calculating the final radiological and toxic burden of the population from exposure to ionizing radiation of radionuclides and toxicants in different places both in Greece and Bulgaria. The final results expressed as an annual dose rate (external gamma-radiation, radon, VOCs, formaldehyde and other carcinogens and allergens indoors), illustrating the final whole body burden of the population compared to the international standard of radiological protection (in the case of radiological hazards) and reference doses or their biomonitoring equivalents (in the case of chemical hazards). The system for human exposure to indoor physical and chemical stressors/ health impact assessment and management will be largely based on already existing computational and data reception/management platform (INTERA) developed by EnvE-Lab in the frame of the CEFIC-LRI funded project INTERA.

16. Industrially Contaminated Sites and Health Network (ICSHNet) – Budget 1,500,000 €

In Europe, earlier industrialization and poor environmental management practices have left a legacy of thousands of contaminated sites: past and current activities can cause local and diffuse contaminations to such an extent that they might threaten human health and the environment. Moreover, health, environment and social aspects related to contaminated sites are strongly interconnected and local communities are often alarmed.

The aim of this COST action is to establish and consolidate a European Network of experts and institutions involved in environmental health issues in industrially contaminated sites, and develop a common framework for research and response through expert networking, conferences, workshops, training and dissemination activities. The network will:

- Clarify needs and priorities
- Support collection of relevant information, methods and data

- Promote shared initiatives and develop guidance and resources on risk assessment, management and communication across Europe.

17. INTEGRA - Integrated External and Internal Exposure Modelling Platform (*CEFIC-LRI*) - Budget: 300,000 €

The objective of INTEGRA is to bring together all available information within a coherent methodological framework for assessing the source-to-dose continuum for the entire life cycle of substances covering an extensive chemical space. Hence, the major component of INTEGRA is a unified computational platform that integrates dynamically in time:

- environmental fate through multimedia environmental modelling across different geographical scales

- multi-pathway and multi-route exposure modelling

- internal dose through the use of detailed Physiology based toxicokinetic (PBTK) modelling.

In this way, the platform is able to differentiate between biomonitoring data corresponding to steady exposure patterns as opposed to acute, one-off exposures. The platform is at tne moment largely validated using human biomonitoring data from Europe and the USA.

The detailed generic PBTK model incorporates life stage changes and physiological and metabolic efficiency change over an individual's lifetime (from conception till 80 years of age). The model also covers perinatal exposure including exposure routes such as lactation, being practically a mother-fetus interaction model. Assessment of biologically effective dose in the target tissue under realistic exposure scenarios, allows the use of internal dose metrics for risk characterization. In this way high throughput system data such as the ones generated by Tox21 *in vitro* testing can be used (e.g. the use of Biological Pathway Altering Dose (BPAD)), towards the nowadays need of "exposure based risk assessment".

In addition, the combined exposure assessment – internal dosimetry modelling framework allows the use of inverse modeling for exposure reconstruction and HBM data assimilation.

The applicability domain of the platform to a large chemical space is expanded through the use of advanced QSAR models for industrial chemicals.

18. URGENCHE - Urban Reduction of GHG Emissions in China and Europe (*7th FP - Large scale project*) - Budget: 4,652,549 €

The project objective is to develop a modelling platform and a related database for urban impact assessment. The platform will be robust, easily transportable to new cities, and can be used for draft or detailed assessment depending on the availability of data. The topics covered are

- urban energy generation and use, and GHG and other pollution release;

- urban spatial data including the urban spatial plan, building stock, transportation, and population;

- socio-economic, demographic, exposure, health and well-being of the population.

The main practical project objectives for each participating city are to:

- Evaluate the current contributions of the heat and power use in the urban building stock, urban traffic and transportation needs, and the overall spatial plan of the city with respect to GHG-emissions, other environmental stressors, environment quality, public health and well-being of the population.

- Evaluate the future public health and well-being impacts of the local

- implementation of alternative GHG-policies, which would meet the locally applicable national, EU and/or international GHG-reduction targets specifically in each city.

- Based on the above, develop and assess an optimised - i.e. maximum net public health and wellbeing benefits - GHG-mitigation policy package for each city.

- Prepare for each participating city a roadmap to this optimised GHG-policy future.

19. TAGS - Tiered Aggregate Exposure assessment of Chemical Substances (*CEFIC-LRI*) Budget: 400,000 €

The objective of the project is the development of a tiered approach to aggregate exposure assessment and the compilation of a computational platform, able to perform quantitative aggregate exposure assessments for environmental and consumer products following a full chain approach (including emission-migration, media concentrations, exposure and internal dosimetry). The use of biomarkers to verify model predictions, to reconstruct population exposure and allocate to apportion exposure to sources (reverse modeling) will constitute a part of the tiered approach and the accompanying guidance. The tiered approach will guide the user through the preparation of the exposure assessment.

20. INTERA - Integrated Exposure for Risk Assessment in Indoor Environments (*CEFIC-LRI*) - Budget: 400,000 €

The main objective of the project will be to define optimal methodologies for predicting indoor exposure to chemical and non-chemical contaminants and their inter-relationships. The work will include the following elements as specified in the call:

- The characterisation and justification of a framework capable of being applied to indoor exposure data/information and covering parameters relevant to their wider interpretation.

- The development/incorporation of appropriate databases of quality assured source data.

- The development/incorporation of suitable models and statistical methodologies for the characterization and treatment of such data.

- The application of suitable models and/or statistical methods that serve to either fill gaps or offer refined exposure assessment where uncertainties are considered unacceptable.

- The ability to display exposure predictions in a number of formats in order that they can be better applied within the context of both research and policy development.

21. GENESIS - GENeric European Sustainable Information Space for environment (*7th FP - Large scale project*) - Budget: € 5 million

GENESIS is an ICT project aiming at the development of a methodology and framework for seamlessly integrating different environment and health information systems across Europe. The role of the JRC-IHCP is to provide analysis of the institutional exploitation of the GENESIS system and advice on the system development including on users requirements.

22. HEREPLUS - Health Risk of Environmental Pollution Levels in Urban Systems (*7th FP - Concerted action*) - Budget: € 2 million

HEREPLUS aimed at developing a methodology for assessing the spatial relationship between ambient air pollution and human health at the urban setting in Europe and for evaluating the role that urban green can play in mitigating the adverse health effects of urban air pollution. More specifically, HEREPLUS:

- developed risk maps relating human health with pollutant concentrations (O_3 and PM) by using the ArcGis approach, taking into account existing and validated epidemiological models in some of the major and more exposed European urban areas, namely Rome, Madrid, Athens and Dresden;

- improved the knowledge of the potential role of different urban vegetation in order to mitigate PM and O_3 pollution levels, by providing best practices regarding the choice of no-VOCs emitting species and through the management of large green areas located in different neighboring urban areas;
- delivered guidelines for municipal managers, administrators and national and international Environmental Agencies appointed to establish urban-environmental measures, which combine risk maps, urban vegetation as a sink for ozone and PM, and minimize health costs. These guidelines were formalized in an Operational Manual of best practices, recommendations and designs for municipal laws, used as a base-line for municipal administrations and European policies.
- encouraged coordination among epidemiologists, biostatisticians, environmental scientists, GIS specialists, bringing about a further step towards realizing the full potential of GIS technology in environmental and health research, and leading to innovative solutions. Moreover, given the different institutions involved as partners at a European level (working in the domains of health, environment, statistics, physics and climatology), HEREPLUS contributed to the development of a multidisciplinary network.
- distributed guidelines and disseminated best practices in Europe through international workshops and a conclusive report.
- supported the implementation of the Global Earth Observation System of Systems (GEOSS) initiative and of the European Environment and Health Action Plan.

23. TRANSPHORM - Transport related Air Pollution and Health impacts (*7th FP - Large scale project*) - Budget: € 8,696,697 million

TRANSPHORM aims to improve the knowledge of transport related airborne particulate matter (PM) and its impact on human health and to develop and implement assessment tools for scales ranging from city to the whole of Europe. As a major output for users and policy makers, it will develop and implement an integrated methodology to assess the health impacts of particulate matter (PM) resulting from transport related air pollution covering the whole chain from emissions to disease burden. This aim will be achieved through enhanced understanding of sources, improved and new emission factors, increased knowledge of particle characteristics and processes, new targeted air quality and exposure campaigns in collaboration with other projects, new concentration response functions (CRF), improvements in modelling of particulate matter and analysis of mitigation and adaptation strategies for policy response.

24. CAIR4HEALTH - Clean Air for health (*6th FP - scientific support action*) - Budget: € 1 million

The overall aim of CAIR4HEALTH is to strengthen and exploit research results obtained by European and other projects related to air quality and health impact in relation to key European sustainable development action plans and strategies.

In so doing CAIR4HEALTH aided the review and horizon scanning process for key action plans including the Environment and Health Action Plan. It examined examine the current European research base - through the research and policy-related outputs from clusters, networks, projects and expert groups including those represented by CLEAR and AIRNET - and proposed recommendations to address the key needs of these policy initiatives.

25. HEIMTSA - Health and Environment Integrated Methodology and Toolbox for Scenario Assessment (*6th FP - Integrated project*) - Budget: € 5 million

HEIMTSA aims to support the Environment and Health Action Plan (EHAP) by extending health impact assessment (HIA) and cost benefit analysis (CBA) methods and tools so that environment and health impacts of policy scenarios in key sectors can be evaluated reliably at the European level.

- Drawing on past HIA/CBA studies, HEIMTSA uses the full chain (impact pathway) approach: Emissions to environmental media ('stressor identification') are derived from sector scenarios in transport, energy, agriculture, industry, households and waste treatment and

- disposal, that are combined and harmonized to result in consistent scenarios for all relevant stressors for the whole of Europe.

- Human exposures (e.g. outdoor and indoor air pollution, water, noise, odour, metals, dioxins) by multiple routes are estimated, using new methods (exposure scenarios and probabilistic modelling), including consumer exposure to facilitate applications of the full-chain approach.

- Health risk functions are derived, with new methods for: effects of combined exposures; estimating background rates; and mapping health impacts, to aid in communication of results.

- Monetary valuation includes review of methods for valuating children's health, developing values for relevant health endpoints, extending the valuation paradigm to include altruism, and new primary studies of pain and suffering.

- New approaches to estimating and representing uncertainty were developed, and applied integrally throughout.

A decentralised modular system for integrated assessment of environmental health impacts was developed, and the entire HIA and valuation methodology applied to baseline and new policy-relevant scenarios in the key sectors, including some effects of climate change.

Results will be reported and presented in innovative ways including the generation of maps that describe the spatial distribution of health impacts and the presentation of the distribution of impacts on different groups of the population.

26. 2-FUN - Full-chain and UNcertainty Approaches for Assessing Health Risks in Future ENvironmental Scenarios (*6th FP - Integrated project*) - Budget: € 3 million

2-FUN aims at developing new methodologies for risk assessment of environmental stressors in the context of assessing future scenarios for the EU-27. The work of the IHCP relates to developing physiology-based pharmacokinetic (PBPK) models for mixtures of environmental chemicals that can be found in different environmental media. The specific models developed so far include the quaternary mixture of VOCs, BTEX (benzene-toluene-ethylbenzene-xylenes), which can be found in the ambient and indoor air, and the mixture of heavy metals and organic pesticides such as arsenic and atrazine, which can be found in drinking water (mainly from surface streams and well water).

27. NO MIRACLE - NOvel Methods for Integrated Risk Assessment of CumuLative stressors in Europe (*6th FP - Integrated project*) - Budget: € 6 million

NoMiracle helped increase knowledge on the transfer of pollutants between different environmental compartments, and on the impact of cumulative stressors, including chemical mixtures. This will facilitate human and ecosystem health monitoring by providing the link with information concerning the condition of air, water, soil and the built environment. By developing and using improved assessment tools and novel models, the project quantified and aimed at reducing uncertainty in current risk assessment and screening methodologies, for example by improving the scientific basis for setting safety factors. The new methods take into account geographical, ecological, social and cultural differences across Europe.

28. HENVINET - Health And Environment Network (*6th FP - Thematic Network*) - Budget: € 2 million

To protect the health of populations and individuals, policies need to integrate environmental and health issues. The aim of HENVINET was to support such informed policy making. HENVINET reviewed, exploited and disseminated knowledge on environmental health issues based on research and practices,

for wider use by relevant stakeholders. Further, it led to validation of tools and results with emphasis on the four priority health diseases of the European Environment and Health Action Plan (EHAP) 2004-2010, and provided structured information overview that was utilised by other actors relevant to Environment and Health Strategy. Building on previous research and policy initiatives such as AirNET, CLEAR, PINCHE, INTARESE and SCALE, HENVINET collected, structured and evaluated material and presented it in a consistent manner, which resulted in transparency and identification of knowledge gaps. HENVINET established an overview of results, activities, projects and tools existing in Europe and promoted stakeholder networking through workshops and annual project meetings. Knowledge, best practices and decision support tools were reviewed to allow wider exploitation by the relevant stakeholders such as policy makers. Recognizing that dissemination of knowledge, best practices and decision support tools is crucial in supporting the implementation of the EHAP, the project defined ways to disseminate information in collaboration with main stakeholders, with emphasis on the needs of users of information, more than of those producing it. To allow for efficient data gathering, information exchanges, and targeted dissemination, the project utilised state-of-the-art Internet solutions and methodologies.