BIOGRAPHICAL SKETCH

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NAME: Panagiotis (Panos) G. Georgopoulos

eRA COMMONS USER NAME (credential, e.g., agency login): panosg

POSITION TITLE Professor, Department of Environmental and Occupational Health and Justice, Rutgers Biomedical and Health Sciences – School of Public Health

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
National Technical University, Athens, Greece	Dipl. Ing.	06/1980	Chemical Engineering
California Institute of Technology, Pasadena, CA	M.S.	06/1982	Chemical Engineering
California Institute of Technology, Pasadena, CA	Ph.D.	03/1986	Chemical Engineering

A. Personal Statement

I am a Professor in the Department of Environmental and Occupational Health and Justice, Rutgers Biomedical and Health Sciences – School of Public Health, with a joint appointment in the Department of Pharmacology of Robert Wood Johnson Medical School. I joined the faculties of Rutgers and R. W. Johnson Medical School in the fall of 1989 with a background in Chemical Engineering and expertise in computational modeling of complex physical/chemical systems. I immediately engaged in collaborative projects with Medical School faculty and that allowed me to expand my computational modeling research from environmental systems to the life sciences and to develop novel systems-based methods for public health applications involving population and individual level studies of toxic exposures and health outcomes. In 1992 I established the Computational Chemodynamics Laboratory (CCL, ccl.rutgers.edu) at the Environmental and Occupational Health Sciences Institute (EOHSI) of Rutgers University. CCL is a High-Performance Scientific Computing (HPSC) Facility dedicated to research in (a) multiscale computational systems methods modeling for environmental and biological applications, and in (b) environmental and biological informatics of the human exposome across life-stages. I have directed or co-directed several Federal, State, and industry funded projects, including international collaborations. Outcomes of these projects were novel computational methods and enviro-socioinformatics, cheminformatics and bioinformatics tools that support source-to-dose-to-outcome studies of individual and population exposures to mixtures of chemical, physical and biological agents present in food, air, dust, soil, water, etc. Currently, my research group focuses on developing computational tools for exposomic studies within an integrative framework that “fuses” physics-based modeling with interpretable machine learning (iML) methods. This effort is producing mechanism-informed data science applications that combine the strengths of mechanistic modeling with the strengths of data-driven information discovery, to address questions in multiscale studies of environmental and climate related health disparities. I have served as co-director of the USEPA-funded Center for Exposure and Risk Modeling (CERM) of the Environmental Bioinformatics & Computational Toxicology Center (ebCTC), a research consortium of RWJMS, Princeton, Rutgers and USFDA. I am currently director of the Ozone Research Center at EOHSI, and co-Lead of the Modeling Facility Core of EOHSI’s NIEHS-funded Center for Environmental Exposures and Disease (CEED) and of the Integrating Special Populations Core at NJ ACTS (Rutgers CTSA). Over the course of the past 30 years I have been the primary advisor/mentor to twenty-one PhD students and twenty-nine post-Doctoral Fellows, who are currently active in research, either as faculty members in academic institutions in the US, India, Korea, Israel, Turkey, Greece, and elsewhere, or as researchers at Federal and State agencies (US FDA, US EPA, CARB, NJDEP, NJDHSS, etc.), and private companies (Google, Bristol-Myers Squibb, Johnson & Johnson, Procter & Gamble, AbbVie, Hoffmann-La Roche, etc.).

Ongoing projects that I would like to highlight are:

NIEHS 5P30ES005022-34, H. Zarbl (PI)
Role: Co-Lead, Modeling Environmental Exposures and Disease Facility Core
04/01/1997- 03/31/2024
Rutgers Center for Environmental Exposures and Disease (CEED)

NIH Clinical and Translational Science Award (CTSA) UL1TR003017, R. Panettieri (PI)
Role: Co-lead of the Integrating Special Populations Core
03/01/2019-02/01/2024
New Jersey Alliance for Clinical and Translational Science (NJ ACTS)

Citations:

1. Ren X., Mi Z. and **Georgopoulos P.G.** (2023) Socioexposomics of COVID-19 across New Jersey: A comparison of Geostatistical and Machine Learning approaches. *Journal of Exposure Science and Environmental Epidemiology,* PMCID: PMC9889956
2. Ren X., Weisel C.P. and **Georgopoulos P.G.** (2021) Modeling effects of spatial heterogeneities and layered exposure interventions on the spread of COVID-19 across New Jersey. *International Journal of Environmental Research and Public Health,* 18(22), p.11950. PMCID: PMC8618648
3. Ren X., Mi Z. and **Georgopoulos P.G.** (2020) Comparison of Machine Learning and Land Use Regression for spatiotemporal estimation of ambient air pollution: Modeling fine scale ozone concentrations across the contiguous United States. *Environment International* 142 105827**.** PMID: 32593834
4. Cai T., Zhang Y., Ren X., Bielory L., Mi Z., Nolte C.G., Gao Y., Leung L.R., **Georgopoulos P.G.** (2019) Development of a semi-mechanistic allergenic pollen emission model. *Science of the Total Environment* 653, 947-957. PMCID: PMC7841766

B. Positions, Scientific Appointments, and Honors

Positions (selected)

2020-present	Affiliate Member, Rutgers Center for Population-Level Bioethics
2019-present	Co-lead of the Integrating Special Populations Core at NJ ACTS (Rutgers CTSA)
2017-present	Faculty Member, Department of Pharmacology, Rutgers R.W. Johnson Medical School
2016-present	Faculty Member, Rutgers Graduate Program in Quantitative Biomedicine
2015-present	Professor, Environmental and Occupational Health & Justice, Rutgers School of Public Health
2015-present	Affiliate Member, Rutgers Climate Institute
2009-present	Associate Member, Cancer Institute of New Jersey
2007-present	Co-Lead, Modeling Environ. Exposures and Disease Core of NIEHS Center (CEED) at EOHSI
2005-present	Co-Director, Environmental Bioinformatics and Computational Toxicology Center
2004-2015	Professor, Environmental and Occupational Medicine, Rutgers R.W. Johnson Medical School
2000-2005	Chair, National Center of Expertise in Exposure Assessment, Consortium for Risk Evaluation with Stakeholder Participation (CRESP-CEEA)
2000-present	Co-Director, Center for Exposure and Risk Modeling (CERM) at EOHSI
1996-2000	Director, Exposure/Dosimetry/Pharmacokinetics Core of NIEHS Center at EOHSI
1995-present	Director, Ozone Research Center, EOHSI
1995-2000	Associate Editor, Journal of the Air and Waste Management Association
1995-2004	Associate Professor, UMDNJ - R.W. Johnson Medical School
1994-1996	Co-leader, Exposure Measurement & Epidemiologic Modeling Laboratory, EOHSI
1992-present	Director, Computational Chemodynamics Laboratory, EOHSI
1990-present	Member, Graduate Faculties of Chemical & Biochemical Engineering; Biomedical Engineering; and Environmental Sciences, Rutgers University
1990-present	Member, Faculty of EOHSI (Environmental and Occupational Health Sciences Institute)
1989-1995	Assistant Professor, UMDNJ - R.W. Johnson Medical School

Scientific Appointments and Honors (selected examples)

2021 Member, Author Team of the Fifth National Climate Assessment (NCA5), U.S. Global Change Research Program (USGCRP)
2021 Member, Expert Review Panel, USEPA's Draft Integrated Risk Information System (IRIS) Assessments for PFA Substances
2020 Member, NASEM External Review Panel of the Department of Defense Biokinetic Modeling Approach in Support of Establishing an Airborne Lead Exposure Limit
2020 Member, External Review Panel, USEPA High-Throughput Stochastic Human Exposure and Dose Simulation (SHEDS-HT) Model
2017 Member, USEPA Science Advisory Committee on Chemicals (SACC)
2017 Member, CDC/ATSDR Peer Review Panel for Modeling Guidance on Indoor Water
2017 Member, USEPA Peer Review Panel for Lead in Drinking Water
2016 Member, USEPA Chemical Safety Advisory Committee (CSAC)
2016 Member, Federal Insecticide, Fungicide & Rodenticide Act (FIFRA) Science Advisory Panel
2016 Panel Member, USEPA NHEERL Technical Qualifications Board (TQB)
2015 Member, USEPA Chartered Clean Air Advisory Committee (CASAC) Science Advisory Board
2015 Member, External Peer Review Committee, USEPA Technical Approach for Lead
2014 Reviewer, Environment and Health Fund (EHF) Pilot Research Grants (Israel)
2014 Member, Air, Climate and Energy (ACE) Centers Review Panel
2014 Reviewer, Danish Agency for Science, Technology and Innovation (Denmark)
2013 Member, FDA Review Panel for FDA-iRisk Comparative Risk Assessment Tool
2012 USEPA Scientific and Technological Achievement Award for Probabilistic Exposure Modeling of Arsenic and Methyl Mercury to Inform Regulatory and Community Decision Making

C. Contributions to Science

1. **Modeling of Climate Change Effects on Environmental Systems and Human Exposures:** Developed and applied novel methods for the mathematical modeling of multimedia environmental and microenvironmental emissions, transport, transformation, and fate of anthropogenic and biogenic pollutants, and of associated human exposures. Applications have included photochemical oxidants, air toxics, atmospheric aerosols, and spores and pollens. An important focus of this research has been the study of climatic change impacts on environmental quality and exposure-related metrics with emphasis on the quantification of heterogeneities and disparities in exposures and associated disease outcomes, through multiscale modeling from continental and regional to local and neighborhood scales.
   a. Ren X., Cai T., Mi Z., Bielory L., Nolte C.G., **Georgopoulos P.G.** (2022) Modeling past and future spatiotemporal distributions of airborne allergenic pollen across the contiguous United States. *Frontiers in Allergy: Sec. Environmental & Occupational Determinants, Special Issue on Climate Change and Allergic Disease*) PMCID: PMC9640548
   b. Ren, X., Mi Z., Cai T., Nolte C.G. and Georgopoulos, P.G. (2022) Flexible Bayesian Ensemble Machine Learning Framework for predicting local ozone concentrations. *Environmental Science & Technology*, PMCID: PMC9133919
   c. Zhang Y., Bielory L., Cai T., Mi Z. and **Georgopoulos P.G.** (2015). Predicting onset and duration of airborne allergenic pollen season in the United States. *Atmospheric Environment* 103: 297-306. PMCID: PMC4302955.
   d. Zhang Y., Isukapalli S., Bielory L. and **Georgopoulos P.G.** (2013). Bayesian analysis of climate change effects on observed and projected airborne levels of birch pollen. *Atmospheric Environment* 68: 64–73. PMCID: PMC3601922

2. **Multiscale Simulation of Biological Systems for Computational Dosimetry Applications:** Developed innovative computational models for quantifying physiologically-based pharmacokinetics, inhalation, ingestion and dermal absorption dosimetry of xenobiotics and mixtures of xenobiotics. A critical component of this research has been the development and application of new methods for characterizing and quantifying uncertainties as well as intra-individual and inter-individual variabilities in pharmacokinetic processes (absorption, distribution, metabolism, elimination) involving xenobiotics.
   a. Royce S.G., Mukherjee D., Cai T., Xu S.S., Alexander J.A., Mi Z., Calderon L., Mainelis G., Lee K., Lioy P.J., Tetley T.D., Chung K.F., Zhang J. and **Georgopoulos P.G.** (2014). Modeling population

exposures to silver nanoparticles present in consumer products. *Journal of Nanoparticle Research* 16(11): 2724. PMCID: PMC4346165.

b. Sasso A., Isukapalli S. and **Georgopoulos P.** (2010). A generalized physiologically-based toxicokinetic modeling system for chemical mixtures containing metals. *Theoretical Biology and Medical Modelling* 7 (1): 17. PMCID:PMC2903511.

c. Yang Y., Xu X. and **Georgopoulos P.G.** (2010). A Bayesian population PBPK model for multiroute chloroform exposure. *Journal of Exposure Science and Environmental Epidemiology* 20 (4): 326-341. PMCID:PMC3063650.

d. Xue J., Zartarian V.,Wang S-W., Liu S. and **Georgopoulos P.G.** (2010) Probabilistic modeling of dietary Arsenic exposure and dose and evaluation with 2003-2004 NHANES data. *Environmental Health Perspectives* 118 (3): 345-350. PMCID:PMC2854761

3. **Multiscale Simulation of Biological Systems for Computational Toxicology Applications:** Developed and applied new systems biology tools, in the context of computational toxicology and toxicogenomics, to predict pharmacodynamics effects. Phenotypic responses to xenobiotics have been modeled in a mechanistic framework linking biological network dynamics across multiple scales, from molecular pathways disrupted by the presence of xenobiotics to subsequent altered function of cellular, tissue, and organ functions. A key component of this research has been the explicit consideration of intra-individual and inter-individual variabilities in pharmacodynamic responses to xenobiotics.

   a. Mukherjee D., Royce S.G., Sarkar S., Thorley A., Schwander S., Ryan M.P., Porter A.E., Chung K.F., Tetley T.D., Zhang J. and **Georgopoulos P.G.** (2014). Modeling in vitro cellular responses to silver nanoparticles. *Journal of Toxicology.* PMCID: PMC4206931

   b. Mukherjee D., Botelho D., Gow A., Zhang J. and **Georgopoulos P.G.** (2013). Computational multiscale toxicodynamic modeling of silver and carbon nanoparticle effects on mouse lung function. *PLoS One* 8(12): e80917. PMCID:3849047.

   c. Stamatelos S.K., Androulakis I.P., Kong A.-N. and **Georgopoulos P.G.** (2012). A semi-mechanistic integrated toxicokinetic–toxicodynamic (TK/TD) model for arsenic(III) in hepatocytes. *Journal of Theoretical Biology* 317:244–256. PMCID:PMC4026948.

   d. Gerecke D., Chen M., Isukapalli S., Gordon M.K., Chang Y.-C., Tong W., Androulakis I. and **Georgopoulos P.G.** (2009). Differential gene expression profiling of mouse skin after sulfur mustard exposure: extended time response and inhibitor effect. *Toxicology and Applied Pharmacology* 234(2): 156-165. PMCID:PMC3066660.

4. **Enviroinformatics and the Exposome:** Developed and applied novel efficient methods of environmental cheminformatics, bioinformatics and socioinformatics for data mining and analytics involving large heterogeneous and multi-attribute databases. Implemented these methods in integrative computational frameworks incorporating spatiotemporal information management systems and applied them to research projects involving multiroute/multipathway human exposures.

   a. Yu C.H., Weisel C.P., Alimokhtari S., **Georgopoulos P.G**. and Fan Z. (2021) Biomonitoring: A tool to assess PFNA body burdens and evaluate the effectiveness of drinking water intervention for communities in New Jersey. *International Journal of Hygiene and Environmental Health* 235 113757. PMID: 33962122

   b. **Georgopoulos P.G.,** Brinkerhoff C.J., Isukapalli S., Dellarco M., Landrigan P.J. and Lioy P.J. (2014). A tiered framework for risk-relevant characterization and ranking of chemical exposures: Applications to the National Children's Study (NCS). *Risk Analysis* PMCID: PMC4158851

   c. Isukapalli S.S., Brinkerhoff C.J., Xu S., Dellarco M., Landrigan P.J., Lioy P.J. **and Georgopoulos P.G.** (2013). Exposure indices for the National Children's Study: application to inhalation exposures in Queens County, NY. *J Exposure Science and Environmental Epidemiology* 23 (1): 22-31. PMCID: PMC3961756

   d. **Georgopoulos P.G.**, Sasso A.F., Isukapalli S.S., Lioy P.J., Vallero D.A., Okino M. and Reiter L. (2009). Reconstructing population exposures to environmental chemicals from biomarkers: Challenges and opportunities. *J Exposure Science and Environmental Epidemiology* 19(2): 149-171. PMCID:PMC3068528.

5. **Risk and Health Safety Analysis for Individuals and Populations:** Developed and applied novel methods of multi-dimensional variability and uncertainty characterization and assessment for supporting and improving diagnostic and prognostic risk analyses of exposures to carcinogens,

neurotoxicants, allergens, irritants, endocrine disruptors, employing both individual- and population-based simulation modeling.

a. Kuan P-F., Mi Z., **Georgopoulos P.G.**, Luft B.J. and Boffetta P. (2019) Enhanced exposure assessment and genome-wide DNA methylation in World Trade Center disaster responders. *European Journal of Cancer Prevention* 28(3) 225-233. PMCID: PMC6329666
b. Lioy P.J., Laskin J.D. and **Georgopoulos P.G.** (2016). Preparedness and response to chemical and biological threats: the role of exposure science. *Annals of the New York Academy of Science* 1378: 108-117. PMCID: PMC5239671
c. **Georgopoulos P.G.** and Isukapalli S.S. (2009). A unified multiscale field/network/agent-based modeling framework for human and ecological health risk analysis. *Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society* 1: 6420-6423. PMCID: PMC3079376.
d. **Georgopoulos P.** (2008). A multiscale approach for assessing the interactions of environmental and biological systems in a holistic health risk assessment framework. *Water, Air, and Soil Pollution: Focus* 8(1): 3-21. DOI:10.1007/s11267-007-9137-7

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