

Martin Joseph Dudziak, PhD

Prof. Martin Dudziak works extensively in the domains of complex non-linear dynamical systems, with research interests in both theoretical and applied areas. His extensive research spans from theoretical and quantum physics, theoretical biology, and computational systems, into the life sciences. Research interests include fundamental problems of emergent organization, structure and networks within space-time physics (quantum relativity, gravity and cosmology) and also in biological sciences (differentiation, communication and control), with a focus upon the use of geometrical and topological models that can also be extended to applications in synthetic intelligence and machine-based learning and pattern recognition, and in specific areas of medicine.

Having received his PhD in theoretical and computational physics at Union Institute and University, following degrees received at Colgate University and Johns Hopkins University, Martin has taught in several US and European universities, within physics, biomedical engineering, computer science, and informatics. Martin has worked in multinational corporations, government agencies and non-profit organizations, focused upon both research and applications. Additional career history information is available at <http://tdyn.org/martindudziak>.

Martin is a founder and executive director of TETRAD Institute (TI), and he is the founder and chief executive officer of Intelligence Renaissance Industries (IRI). He has been active in recent years as an affiliate, special, and/or visiting professor in USA and Europe and also as a consulting scientist and executive with several organizations in the medical, pharmaceutical and computer industries. His multicultural experience and expertise has led him to work in and with diverse peoples in diverse environments, leading to current work that emphasizes social and health applications of fundamentally theoretical research and methods.

Dr. Dudziak's teaching and research currently extends his physics and mathematics work into areas within the health sciences and medical disciplines, spanning relevance within neurology, infectious and autoimmune disease, virology, and epidemiology. Within TETRAD Institute, he is principal investigator for the Neuroplex Focus Project, investigating non-linear, chaotic, stochastic and turbulent systems linked to etiology and progression of dysautonomia, arrhythmia, autoimmune and inflammatory diseases.

Within IRI, he directs the VESID Focus Project – a novel approach to developing prophylactic and therapeutic antiviral medicine that will also enhance vaccines and natural antibody response, for SARS-CoV-2 (COVID-19) and other viral pathogens, and projects in biomedical and epidemiological informatics.

Within these and prior project and research areas, Dr. Dudziak has been directly involved in diverse technologies including: synthetic intelligence ("AI"), Bayesian and neural networks, parallel processing, topological models, quantum information, directed acyclic graphs, MEMS-based sensors and data acquisition systems, cybersecurity, virtual and augmented reality, "CBRNE" detection and tracking, and applications in areas directly pertaining to both public health and security (e.g., counterterrorism). This work, spanning more than three decades, has been conducted and funded by both corporate and governmental and private foundation sources, in USA, UK, EU and other countries.

Teaching, consulting, and joint-venture collaboration are areas in which Dr. Dudziak is active through online (remote, distance-based) as well as onsite (travel-based) affiliations. Martin has worked extensively over his career to establish strong international and multi-cultural relationships to benefit people in diverse societies and situations of need, including emergency response. Now he is the initiator of the EMME Project. This involves environmental monitoring with attention to species migration and mutation and the evaluation of risks and indicators of emerging pathogens and epidemic/pandemic-potential diseases. Dr. Dudziak is leading a multinational team to address some of the most severe health and social challenges in human history.

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