

**Martin Joseph Dudziak PhD**

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**Key Strengths** Strategic planning, project coordination; technical analysis, integration, and implementation  
Personalized-Precision-Public Healthcare and Safety Internet-of-Things and Cloud-Computing  
Intelligent Telemedicine and Remote Services Wearable/Embedded Sensors/Diagnostics  
Design, Introduction, Adaptation of New Technologies Knowledge Acquisition, Inference, Informatics

Note Carefully: this resume covers only work, appointments, positions through mid-2015 in any detail. Later events are briefly summarized here:

**§ 2016 – 2020:**

Academic appointments have included visiting/special professorship at University of Michigan (2015-2016), St. Petersburg State University (2017-2018), South Urals State University (2017-2019) and Michigan Technological University (2019).

Employment is jointly with **TETRAD Institute** (2018 – present) – [www.tdyn.org](http://www.tdyn.org) and **Intelligence Renaissance Industries** (2018 – present) – [www.intelrenaissance.com](http://www.intelrenaissance.com). Main application projects have been and continue to be **MedAtrium** (mobile reconfigurable medical diagnostics and analytics laboratory), **Eyrie** (medical informatics and epidemiological system) and **VESID (Viral Entry Structural Integrity Disruption)**, an antiviral medicine for prophylactic and therapeutic action. Theoretical research also includes Reflexive Topological Dynamics and Topological Biomolecular Dynamics, both based upon origins and emergence of order and structure in fundamental physics and biology through implicate order potentials that govern formations of inherent random behaviors. This work leads directly into the applications now being investigated within cellular biology, immunology, virology, and related areas of medicine.

Papers, reports, presentations, conferences:

Updates can be found in main CV and in list of materials at <http://tdyn.org/martindudziak>.

**Professional Experience****§ 2004 - 2015: Chief Scientist, TetraDyn Ltd. and SenSelpha (companies within the TETRAD Group)**

iQs (IntelSphere) project, focused upon healthcare and security applications – integration of multiple user-apps and server-side (cloud) resources for intelligent tracking, contacting, monitoring (ongoing projects, including InTeleMed, a telemedicine and customer-service suite of applications focused upon hospital networks and public health systems including USA, EU and India.

Qoins, a class of wearable/carry-able small devices that communicate with and perform control functions with phones, tablets, watches, fit-bits, and other mobile or stationary consumer computing devices. Multiple classes of Qoin devices provide special features for sensing and/or memory and power, with wi-fi, Bluetooth, NFC, RFID and physical connectivity. Foremost are sensor-monitor devices and apps for anti-oxidants (oxidative stress), hydration, cardiac arrhythmia, brachytherapy.

GEMIS - Global Epigenetic Medical Information Synthesis – international program in personalized, demographic and multi-cultural-national health informatics. Integrated knowledge bases including established and emerging genomics, proteomics and epidemiological tracking and forecasting systems, incorporating distributed grid computing and intelligent-agent technologies employing the open IoT (“Internet of Things”) - strong utilization of personal mobile and wearable devices and public networks.

PodAtrium and MedAtrium – mobile, modular, rapid reconfiguration, assembly, transport clinics and labs, for use in remote and inaccessible regions or sites of conflict, disaster, recovery. Architecture, engineering, software systems, operational protocols.

Other Joint-Venture and funded R&D projects include:

Wearable systems for chemical, biological, radioactive and explosives sensing, integrated with smartphones and other devices.

Fashion-wear sensor-actuator for cosmetic and insect-repellent application.

Consultation and contract list (partial): Apple, BP, BASF, Boeing, Brookings, CDC, DHS, DTRA, EUPHA, Exxon-Mobil, IBM, Intel, JHU, Mt. Sinai, NYU, P&G, SAIC, UN, USMC, US Navy, Vanderbilt, VCU, WHO

Designed and implemented intelligent control, sensing, imaging and actuator response, principally embedded, wearable, wireless modular architectures. Projects include: **CEBIT** (Chemical-Explosives-Biological Identification and Tracking), **Nomad Eyes** (distributed situation awareness, early warning and response network), **CUBIT** (Coordinated Unified Biothreat Intervention and Treatment). Other collaborative sensor work has involved nucleic acid amplification techniques (PCR) and immuno-assay with optical waveguides.

**§ 2000 - 2004: Group Manager and Research Lead, Intel Corporation (USA, Costa Rica, Russia)**

Design, prototyping, and field/market testing in US, Latin America, and Europe for healthcare-related tablets and home-device (TV, theater) networks, automobiles, and wearables. “Skunkworks” type prototyping of camera and video devices and a specific

biothreat alert apparatus. Developed TNT – Tagged Nanotreads – carbon nanotubes with luminescence for detection of specific antigens including anthrax bacillus.

Responsible for consortium-based research activity with regional (Costa Rica and Latin America) scientific institutions (CENAT, FUNDES, LANAMME) as part of corporate new business development. Assisted as analyst/adviser for Intel Capital VC investment in Latin American and Russian enterprises into which Intel had stakes or was reviewing for potential investments.

#### § 1996 - 2001: CEO and Director of R&D (Co-Founder), Silicon Dominion Corporation, Richmond, VA

Wearable systems comparable to Google Glasses for DARPA and US Dept. of Defense. Mobile, wearable wireless (multi-protocol) architecture, software, hardware for environmental and health applications. High-speed broadband streaming applications including vMessaging and ePresents – pioneering first-case systems of what later became social networks as they evolved in the 2000s. Focus was on biomedical applications including for remote/tele-assist ultrasound diagnostics.

Directed development efforts of startup R&D company (with a twelve-person offshore tech team; Russia and Eastern Europe) producing: Internet-based research and research-collaboration tools. Products included Open Stream Media and Open Net Tool Suite (medical and public health oriented software and networks), and MODE (magneto-optics-based sensing and measurement). MEMS-based molecular sensing R&D led to platform of molecular-scale pathogen detectors.

#### § 1993 - 1998: Assistant/Associate Professor, Physics and Biomedical Engineering (dual appointments), Virginia Commonwealth University (Medical College of Virginia), Richmond, VA

Designed and implemented world's first functional international telemedicine network for use between medical practitioners and providers in several Eurasian countries, as well as a dedicated telemedicine platform for use by medical teams providing specialty (cancer treatment) and emergency services in remote and problematic areas of the world ("Medicine for Humanity").

Founded and directed Molecular Engineering and Biocomputing Center (MEBC Lab). Implemented a pioneering internet-based telemedicine information resource and medical informatics network linking U.S. hospitals & companies with foreign institutions. first such web-based system used internationally. Developed patient-oriented basic health and infant care learning resources for young mothers in disadvantaged social settings (Richmond, VA).

#### § 1988 - 1993: Senior Scientist, Special Projects, SGS-THOMSON Microelectronics (now ST.com), Baltimore MD (Concurrent 1991-1992: Visiting Faculty, VA Tech & Radford Univ.)

Introduced use of AFM and STM for defect and fault analysis. Designed prototype development of real-time parallel processing and also a pattern recognition (neural net) processor chip for object recognition and microcontrol. One focal area was in addressing error tracking and correction within very large parallel systems. Core neural chip was later applied to handwritten character recognition, later also applied to EKG and EEG image patterns. Led and served on team and task group for prototyping, training on new microprocessor and image processing devices. Established corporate-university joint research project for neuro/cardio medical signal processing including research in brain hologram and quantum biology models.

### Select Relevant Projects and Engagements

**BioProt** (analysis, surface bioprotection treatment, monitoring, and training of workers, students, general-public, for preventive measures against a variety of contact/exchange-transmissible pathogens; expanded to collaboration with a clinical team that has developed superior bioprotection for in-body post-op bioprotection re: orthopedic surgery and implant devices/procedures)  
[Data acquisition and collection, sampling, analytics, verification, statistics, visualization and chem treatment, clinical research and trials planning and management](#)

**CUBIT, CRAIDO and Race-to-Resilience** (community-centric rapid-response including modular mobile system for biothreat validation, intervention and treatment coordination; primary case study for H5N1, expanded for H1N1 and H7N9, with emphasis on mutation detection & tracking, epidemiological monitoring, social behavior analysis supporting social resilience)  
[Real-time data acquisition, bioinformatics modeling and testing, web-based CMS, DBMS](#)  
[Laboratory research, program management, agency/sponsor interfacing and presentation](#)

**CommonHealthNet (iMedNet)** (one of the first web-based telemedicine networks and early social network communities, linking American medical professionals and students with disadvantaged-nation medical providers; later variants: FuturesGateway, Saño y Salvo, and Medicine for Humanity field gynecology clinics)  
[Web-based interactive CMS and DBMS with image and video libraries and notification system](#)

**GEMIS** - Global Epigenetic Medical Information Synthesis (ongoing project incorporating rapid, real-time assimilation and anomaly-detection, plus intelligence-assisted distribution, of information drawn from personal and public health records, including accumulation of data from available IoT (internet-of-things) devices such as wearable monitors and sensors, and self-report data by individual users. Focus presently is upon early-stage and advance warning for probably epidemic/pandemic scale events and transmission paths for infectious diseases; specific focus on respiratory viruses (e.g., influenza, coronavirus).)  
[Web/mobile communications, microsensors, data acquisition, AI, pattern recognition and icyber-security](#)

**Nomad Eyes** (chem-bio-rad-threat focused network for detection, recognition, assessment, alert, and response, geared for civilian populations, adapted to influenza and food/water-borne epidemics- both home/institutional use; stochastic distribution, wireless and cellular devices; redesigned and upgraded for functionality with generic smartphones and tablets)  
(and closely coupled)

**RedBioNet** (focus on early-warning biothreat detection in wildlife and rural/uninhabited environments, employing distributed sensor arrays and mixed-media information gathering from local including public sources)  
Microsensors, wireless communications, data acquisition, AI, mobile networks, sensor interfaces, and info-security

### **COPPER – Critical Operations Preparedness and Procedures for Emergency Response**

(ntegrated suite of systems incorporating machinery, medicine, information technology, communications, COOP, sensors, tracking and estimating for communities (including local, state and federal govt. agencies, companies and other organizations to use in response to emerging and actual disasters such as storms, floods, earthquakes, fires, pandemics, addressing multiple issues such as debris estimation, handling and tracking, equipment and personnel logistics, mass casualty and triage procedures, and socioeconomic continuity)

Web/mobile-enabled computational modeling, simulation, database and web programming, wiri-fi and satellite communications, network administration and cybersecurity; environmental health and safety, particularly in IDLH and CBRNE domains; equipment and staff planning, logistics, supply-chain management, tracking and locating; GIS, GPS, GTS, RFID

### **Relevant Computing Technologies (Direct and Management of Projects and Teams)**

Yii and related HTML5, CSS3, Responsive-Web Environments  
PhoneGap, AppsGeysers and related mobile-app generating platforms for Android and iOS

Agile, Scrum, XP Methodologies for Project/Team Management and Laboratory Informatics Management (LIMS)

(alphabetical order of languages and programming environments)

C, C++, C#, Clojure, Common Lisp, Go, Java, Javascript, Matlab, Mathematica, OCCAM, Parallel C, PHP, Python, Scala, SQL

### **Additional Scientific, Technical, Management, Marketing-related Data**

Including papers published, presentations, courses-taught, workshops, project specifics, international experience, grants and other funding, visiting appointments, references: available in full CV and supportive documents, some of which may be found at <http://martin.tdyn.org> and also at <http://tdyn.org/martindudziak>.

### **Special Experience including Volunteer Work, Developing/Underdeveloped Locations, Emergency/Disaster Situations**

Virginia – 2014-present) - S.H.A.K.T.I. Warriors youth after-class program (nationwide) program in Science Tech Engineering Arts Maths (STEAM) activities - STEAM planning advisor and IT-projects implementation mentor

Donbass Region, Ukraine – Spring 2014 – Medical logistics and communications relief assistance in conflict zones

Richmond, VA - Spring-Fall 2012 - Volunteer on pro bono developmental project, Armstrong Renaissance Center, re-use for community and educational purposes of Armstrong High School

Greenville, NC – Sept 2011 – QC/area field manager and health/safety mgr. for private regional contractor in emergency disaster response work throughout the city.

Richmond, VA - Fall 2010 - Fall 2011 - Volunteer organizer/teacher/mentor for STEM and Robotics projects, also member of facilitator and judging team for Intel Science Fair projects

Galveston/Houston area, Texas – Sept 2008 – served in volunteer medical corps team providing physical and technical and basic relief assistance to residents after Hurricane Ike.

Gulf Coast area – Sept 2005 – provided remote-based assistance using NomadEyes and related web-based technology for logistics support and in particular for personal and family tracking/reconnecting and for locating medical and energy supplies.

Moscow region, Russia – Summer, 2003 – participated as member of volunteer medical assistance team in rural forest areas in response to peat-bog fires causing extreme smoke and health threats.

Chernobyl and Semipalatinsk regions (Ukraine and Russia) – 1992 thru 2002 on multiple occasions – monitoring and data collection/analysis of nuclear radiation and health effects on humans, animals and crops.

Costa Rica – May 2002 – major floods - volunteer (as part of Intel corporate responsibility program) member of team assisting residents, schools, clinics, and also engaging in telecommunications technical assistance.

Costa Rica – July/Aug 2002 – volunteer (as part of Intel corporate responsibility program) member of team including geologists and civil engineers doing post-earthquake (6.2) assessment and assistance to neighborhoods, schools, and also participating in two volcano expeditions.

Richmond, VA – Sept 1996 – volunteer relief and debris work throughout the greater Richmond area, particularly in vegetative debris cutting and removal and assistance to homebound, disabled and/or power-less persons.

SW Virginia – winter of 1992-93 and Jan-Feb 1995 – participated in community and state-organized teams for rescue and relief after major ice storms (including by snowmobile and skis) to homebound persons, particular families and the disabled/elderly, in the mountainous areas around Blacksburg, Radford, Pulaski and surrounding areas.

Baltimore, MD – January 1987 – volunteer in relief efforts after passenger train collision in rural Maryland.

NW Michigan – winters of 1978 through 1982 – member of health-safety rescue teams operating in response to blizzards and ice storms, assisting mainly rural residents, including two missing-person search operations; also volunteer counselor at public crisis intervention center.

Costa Rica – Summer 1981 – member of volunteer search and rescue and flood relief and rebuilding teams in Limon region

Santa Barbara, California – Summer 1977 – worked on crew in forest-fire fighting in the Santa Ynez and Topatopa Mountains, including a ground search for hikers in the Sespe Canyon area.

### **Formal Higher Education**

§ BA (high honors), dual-major (Philos/Phys), Colgate University, Hamilton, NY

§ Postgrad program in computer science at UCSB and UCLA, Los Angeles, CA

§ MA, Philosophy of Physics (concentration: quantum logics) Johns Hopkins University, Baltimore, MD

§ PhD, Theoretical and Computational Physics, Union Institute and University, Cincinnati, OH (1993)  
“Quantum Processes and Dynamic Networks in Physical and Biological Systems”