

Martin – some specific computer (software, hardware) and also medical backgrounds – brief summaries

I quickly gathered this from my different and older CV (curriculum vitae) and some other “professional biography” pieces

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Summary of EE/CIS (IT/IS) technical (typical standard systems, tools, languages)

**Architecture and design of applications and large enterprise-scale systems**

Use-Case, UML, Erwin, Corba, OOP, Rational Rose, XP (eXtreme Program), Agile, Crystal, Scrum

**Artificial intelligence, machine learning, pattern detection, classification, recognition, data mining, “Big Data” management**  
Classical AI (Rete networks, SOAR, rulebased, Prolog, Lisp), TensorFlow, fuzzy logic, neural networks, statistical models

**Programming languages and tools**

Lisp, C, C++, Java, JavaScript, Prolog, Matlab, Mathematica, Macsyma, Maple), Forth, Fortran, OCCAM, Parallel C, occam-pi, Python, PHP, SAS, Common Lisp, Clojure, Scala, HTML5, CSS3, Responsive-Web Environments, SQL

**Electronic device design and testing (board/system level)**

Transputer chip/board, Intel microprocs, National instruments (DAQ). Transputer family, also DSP chips, ARM cores

**Microprocessor (chip) including MEMS design and tools**

Cadence, CoVentor, Intel-proprietary, ST-proprietary, Synopsis, Transputer family (IMOS, ST), neural chip (ST-10/ARM based), Nomadics, also DSP chips, ARM cores

**Multiprocessing and parallel processing**

MIMD and SIMD algorithms, multicore, RMS (DRMSO), Transputer chip and compiler design

**Selected Analytical Instrumentation Technology Skillsets (hands-on and project mgt)**

Spectroscopy: PAS/RePAS (Photoacoustics), Immunoassay, Piezo-resistive microcantilevers (PRMC)

Microscopy: particularly SPM, AFM, MFM, SEM, TEM, Magneto-Optics

Analytical instrumentation: GC, GC/MS, Micro-GC, HPLC, FTIR, NMR, THz/MM

Biomedical instrumentation: NAAT (PCR), cell/tissue culturing, EEG, EKG, MRI

Laboratory Informatics Management (LIMS)

Selected biomedical engineering, medical computer science and informatics, public health, epidemiology work

**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 icyper-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)

### **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**

(integrated 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](#)

## Selected Courses Taught at University (G=Graduate) Level

- Cellular Automata and Discrete Systems
- Chaos, Fractals, & Stability in Biology (G)
- College Algebra & College Mathematics
- College Physics (intro/intermediate)
- Complexity and Nonlinear Systems (G)
- Computational Biology (G)
- Contemporary Theoretical Physics (G)
- Critical and Analytical Thinking
- Cryptography and Cyberdefense
- Godel and Computability (G)
- Issues in Quantum Mechanics (G)
- LISP and PROLOG programming (G)
- MATLAB, Maple and Mathematica
- Medical Image Processing (G)
- Microcomputer & Multiproc Architectures for BME (G)
- Molecular Engineering and Imaging (G)
- Neural Networks & Pattern Recognition (G)
- Neurocomputing Architecture/Systems (G)
- OCCAM & C/C++ Parallel Processing (G)
- Philosophy of Physics (G)
- Quantum Measurement (G)
- Quantum Physics and Theory (G)
- Relativity (G)
- Research Methods & Statistics
- Scanning Probe (AFM) Microscopy (G)
- Signal Processing (G)
- Statistics and Thermodynamics (G)
- DSP, Transputer & Multiprocessor Architectures (G)

## Selected Student Projects (principally at graduate level or PhD candidacy level)

- Simulation of quantum-entangled cellular automata virtual machine
- Automatic chromosome aberration scoring using competitive neural networks
- Prototyping of multimedia relational biotech databases with Principal Component Analysis data mining
- Integration of cellular automata and neural networks with SPICE models of cellular chemical communications
- Neural network classification of QSAR on mutagenic activity of nitroaromatic and heteroaromatic compounds
- Neural net modeling of Alzheimer's senile dementia and also pharmacological population kinetics
- Pharmacokinetics employing neural networks and genetic algorithms applied to non-linear time series
- Deformable image processing for topological feature extraction in cell membranes
- VRML and ISOVIEW 3D imaging and molecular modeling software
- Artificial life (cytoskeletal dynamics) simulation engine
- MediPAC and MediCard ("smart card") medical database interface prototype
- Pattern recognition and classification on MRI, CT, AFM and STM scan images
- Real-time tele-engineering with Nanoscope and AutoProbe LS scanning probe microscopes
- Modeling 2d and 3d soliton and PDE equations in MATLAB, Mathematica, and MacSyma
- In vitro imaging of neural and glial cells and AFM-detected cytoskeletal features
- Cellular automata modeling of cell membrane and cytoskeletal structures
- Magneto-optic scanning and measurement within in vitro cell cultures
- Magneto-optic nondestructive testing and confirmation of structural elements and secure documents
- Artificial intelligence applications in ETL and data warehousing for semiconductor fabrication and IC assembly/test
- Encrypted distributed digital signature system for use with smartphones and wearable internet devices
- Mutual information and deformable pattern registration for synchronizing MRI and CT
- Stochastic and quantum-chaotic modeling of entity-relationship object networks
- Simulated annealing and stochastic computational artifacts
- Biosolitons as a mechanism for molecular memory and signaling