

Martin's Technology Comfort Zones

Technology Comfort Zones – areas in which I have and can work and feel comfortable, spanning from R&D to product eval, development, commercialization, teaching, explaining, reviewing, etc. in the context of TETRAD's business model

Tech Area (listed alphabetically by discipline and within by specialization)	Levels (1 (lower) – 5 (highest) – hands on) (M1 – M5 – manage projects, groups)	Examples of prior or recent work in this area	Specific example knowledge areas, techniques, methods, skills
Biomedical Engineering			
Computational modeling and simulation	3, M4	Research in STM, AFM with microtubule structures, cellular manipulation devices, Grad level teaching	Finite-element analysis, MATLAB and SPICE based models
Microelectronics	3, M4	BioScan, Grad level teaching and student projects	Board-level design, fabrication and testing
Nanomaterials / “nanomedicine”	3, M5	“TNT” for antigen sensing, CENAT/LANAMME leadership/mentorship in setting up carbon nanotube lab	Carbon nanotube production and imaging, “TNT” – tagged nanothreads for drug delivery
Biochem & Molecular Biology			
Modeling and theory	3, M5	aspects of PhD study and thesis, grad level student projects, quantum bio research	Microtubule network modeling, intracellular dynamics, cell membranes
Maths, modeling, simulation	4, n/a	Cytoskeleton studies (MCV, SDc) and current work on topological transduction models	Membrane-MT signaling, immune system development, mechanotransduction, epigenetics
Cell Biology / Immunology			
Wet lab experimentation	2, M4	in support of AFM bio and materials experimental work, grad level student projects	In vitro culture of multiple strains of neural and glial cells and testing using AFM, EM (SEM) and optical microscopy
Maths, modeling, simulation	4, n/a	Cytoskeleton studies (MCV, SDc) and current work on topological transduction models	Membrane-MT signaling, immune system development, mechanotransduction, epigenetics
Chemistry			
Inorganic	1, M3		
Organic	1, M3	in support of AFM bio and materials	collaborative work in chemical and

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		experimental work, grad level student projects, CB sensor research	explosives detection
Counterterror/Defense/Security	"M" roles n/a	<i>(I can describe in person more details for these two rightmost columns here and below)</i>	
Terrorist cell, network and tactical modeling	4	Nomad Eyes, I ³ BAT	construction, deception, countermeasures, detection, recognition, circumvention
CBRNE and IED threat design	5	" " "	
CBRNE/IED countermeasure design	4	" " "	
Radiation terrorism methods	5	" " "	
Mathematics	"M" roles atypical	basic and applied, theory & also computing, and in most cases, teaching experience	
Algebra	4		
Complex and nonlinear systems	5		
Geometry and topology	4		
Inverse methods	5		
Number theory (incl. cryptography and cryptanalysis)	3		
ODE and PDE (partial diff. equations)	4		
Set theory, combinatorics, Morse theory, Ramsey theory	4		
Soliton theory	5		
Statistics	2		
Microbiology & Epidemiology			
CA and HA infectious disease	3, M3	All the current and recent bioprotection work; CUBIT	
Neuroscience			
Modeling, simulation, theory	3, M3	principally neural networks and theory underlying neural processing	
Philosophy and Logic	"M" roles atypical	"applied" to other work and also teaching	
Cognitive science, epistemology	3		

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Critical theory	2		
Modern existentialism	4		
Formal and symbolic logic, semiotics	4		
Phil. of math and science	4		
Physics		<i>(I can describe in person more details for these two rightmost columns here and below)</i>	
Computational physics	4, M5		
Chaos, complexity, nonlinear sys	5, M5		
Imaging and signal processing	3, M4		
Nanomaterials and "nanotechnology"	4, M5		
Quantum physics, relativity, cosmology	5, M-atypical		
Radiological imaging/physics	3, M3		
Solid-state and semiconductor physics	3, M4		
Physiology	2, M3	in support of AFM bio and materials experimental work, also comp modeling	
Electr Engr & Computer Science (including Information Technology)		<i>(I can describe in person more details for these two rightmost columns here and below)</i>	
Architecture and design of applications and large systems	4, M4	SOLON (AUV & UAV and Aegis weapon systems), work at Battelle, ADAM (ETL) at Intel, CommonHealthNet (telemedicine project)	UML, Use-Case modeling, Erwin, Corba, OOP methods, Rational Rose, XP, Agile
Artificial intelligence, machine learning, pattern recognition	4, M5	SOLON, Horus, work at Comshare, Battelle, Martin-Marietta, VCU, Silicon Dominion, analytics within Nomad Eyes	Classical AI (Rete networks, SOAR, rule-based systems, Prolog, Lisp), fuzzy logic, neural networks, statistical models
Databases and data warehouses	2, M4	pretty much entered into one aspect or another of most R&D and applied work all my life	GENOA, TIA, ADAM (Intel), PANDA

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Data mining	4, M4	Ditto	GENOA, TIA, CASE, Tangram, Phoenix, CHAIN, PANDA
Electronic device design and testing (board/system level)	2, M2	ASW, AUV, Transputer chip/board, Intel mprocs, National instruments (DAQ)	
GIS	2, M3	work for Virginia DOT project, part of Open Net, part of Nomad Eyes and SACS/ECLEAR development	ArcInfo, ArcGIS (rest of ESRI family), Intergraph
Information security and cyberwarfare	3, M4	part of work at/for Battelle (AFRL-Dayton, ARL), CIA, ARDA	
MEMS concepts, design, & software tools	3, M4	Cadence, CoVentor, Intel-proprietary, ST-proprietary	
Microprocessor (chip) design	2, M2	Transputer, DSP, neural chip (St-10/ARM based), Nomadics	
Multiprocessing and parallel processing	4, M5	Transputer chip and compiler design, applications to AUV and UAV systems, grad level teaching, use in R&D projects, part of core of Nomad Eyes analytics, I ³ BAT / I ³ DIT work	MIMD and SIMD algorithms, multicore, RMS (DRMSO)
Programming languages	3, M4	pretty much entered into one aspect or another of most R&D and applied work all my life	C, C++, Java, Lisp, Prolog, Forth, Fortran, Pascal, OCCAM, TCL, Python, PHP, Perl, ... enough?
Streaming media	3, M3	became central focus of products and offerings of Silicon Dominion, 1997 – 2001	Designed and implemented leading out-performer for video streaming – matched or exceeded Real, WMP, Akamai
Web system design and implementation (incl. CMS, portals)	4, M4	pretty much entered into one aspect or another of most R&D and applied work all my life	
Other assorted keywords describing areas of mainly applied science and engineering	→ →	Principal Component Analysis, simulated annealing, scanning probe microscopy, SPM, AFM, inverse method, Bayesian, RMS, epigenetic, cytoskeleton, microtubulin	AUV, UAV, CAD-CAM, Lidar, Radar, sub-surface sensing, magneto-optics, Hall effect, Faraday effect, nondestructive test

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