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Colorado School of Mines - BSc - Mathematics

Architect, Designer, Teacher and Mentor for 27 Years

My current interests revolve around humanistic practices, teaching and polyglot languages. I also enjoy constantly learning about UI, cloud and data innovations. I have recently written two mini books about Humanistic and Data Science Practices.

Over the years I have worked with groups to simplify core technologies to focus on their strengths. So web UIs are dedicated to the user experience, services reflect business expertise, databases model semantics, the cloud transparently links platforms and data science realizes benefits. I have found the most productive technologies to be: languages: (Scala, CoffeeScript, Math DSLs), visualization (D3, Plotly, MathBox, Leaflet), cloud platforms: (Akka, Apache Spark, NodeJS).

My best experiences have always revolved around teaching and mentoring that began in 1974 when I was a founding member of the Math Lab at Arapahoe Community College.

27 years of experience in each the three disciplines of Technology, Languages and Practices:

| Discipline | Experience | Y | Experience | Y | Experience | Y | Experience | Y |
|------------|-------------|-----|---------------|---|--------------|-----|---------------|---|
| Technology | Spark / GIS | 2,3 | UI | 7 | Akka/J2EE | 2,5 | Data Modeling | 8 |
| Languages | Scala | 9 | CoffeeScript | 7 | Java | 6 | C++ | 5 |
| Practices | Humanistic | 8 | Math / Visual | 7 | Data Science | 6 | Teaching | 6 |

Presentations

- Humanistic Practices (Book and Presentation) - Refresh Denver 1/11/2017
- Data Science Practices (Book and Presentation) - Data Science Association 9/7/2016
- Getting to Know Scala for Data Science - Data Science Association 6/24/2015
- Reactive Principles in Data Science - Data Science Association 2/28/2015
- Scala Math DSL- Denver Scala Users Group 6/11/2013
- Math Box 3D Visualization - HTML5 Denver 5/13/2013
- GIS with Leaflet - Denver JS 5/2/2013 and Den of Clojure (OpenBike) 6/20/2013
- An Architectural Blueprint for a REST CMS in NetKernel - NetKernel Conference 4/14 2011
- The Evolution of 4-Tier Architectures with REST - Northern Colorado Architects 12/15/2010
- A Practical Road Map to Enterprise Architecture - Denver Open Source Users Group 10/5/10
- Polyglot Panel & Scala Expert - Denver Java 4/14/10 CO Springs 11/25/10 Boulder 5/10/11
- Polyglot Principles (Book) - The principles that inspired Scala Clojure Groovy Ruby 2010
- Principles of Programming Languages - 2/2/10 Scala Groovy Clojure Smalltalk Lisp & Ruby
- Scala Paradigms Denver 8/5/08 8/4/09 Boulder 8/11/09 CO Springs 8/26/09

Humanistic Practices 2016-2017

Since 1990 I have refined my methodology to 9 core practices have evolved from an innovative technology focus to embracing a collaborative culture that encourages creativity over process. In the past these practices incorporated Enterprise Architecture, Agile and Design Patterns. Over the course of my career a key enabler has been the hands on experience and teaching on how to derive benefits with each practice at University of North Texas, Wisconsin, California, XCare, DMR, Williams, NorTel and Glaxo. I current working to extend Humanistic Practices to Data Science, Knowledge and Wisdom. See: [Humanistic Practices](#)

| | Embrace | Innovate | Encourage |
|--------------|----------------|-----------------|------------------|
| Learn | Collaborate | Product | Discovery |
| Do | Adapt | Technology | Benefits |
| Share | Change | Production | Govern |

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|-------------|--|
| Collaborate | Team building with psychological safety for creative interaction |
| Product | Transforming value propositions into an attractive portfolio |
| Discovery | Finding and sharing our vision within our company and to our clients |
| Adapt | Tracing features, components and acceptance to fine tune our efforts |
| Technology | Innovative 4 tier architecture, engineering and construction |
| Benefit | Realizing the benefits that propel our discoveries |
| Change | Continuous delivery leading to evolutionary architecture |
| Production | Sharing our work with our client communities on the cloud |
| Govern | Inspiring resources to improve the maturity of our communities |

UI/UX Applications at Axiom 2010-2015

Created UI/UX apps with refined JavaScript library management, page navigation with REST / JSON interfaces. The web technology stack included: CoffeeScript, Electron, RxJS, Vue.js, jQuery, Backbone, Visualization (D3, Leaflet, Math Box), CSS3(Less, Sass), Test(Jasmine, PhantomJS) and Phone Gap for mobile. In 2014 I brought in RxJS to replace MVC with notification driven publish and subscribe. Built REST servers in Akka and NodeJS. Leveraged NodeJS with CommonJS for development.

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| Exit Now | 2015 | Won the GoCode Denver Competition on April 19 with a mobile app for I-70 |
| Visualization | 2014 | Data Science browser app in PivotTable, D3, Math Box and Plotly |
| DN2K | 2013 | GIS in Leaflet with crop layers and symbols for farm management |
| Snugg Home | 2012 | Contractor mobile app for capturing energy savings specs in homes |
| PSS | 2011 | Upgraded JavaScript and CSS UI practices for ordering medical supplies |
| Part Miner | 2010 | Create all web pages in HTML for an electronic part search portal |

Enterprise Architecture at State of California 2009

In 2008 my partners secured a contract with California's Health and Human services. We converted asset data to the Federal Enterprise Architecture (FEA) reference models (BRM SCRM, DRM, TCM, PRM). We then mapped the FEA repository to Humanistic Practices that we taught seminars about. WE made the FEA accessible to all 13 health departments. To focus on capital budgeting we replaced the PRM score cards with CPIC that our clients used to justify health service budget allocations.

Symbolic Math at Glaxo 2007-2008

To learn Scala I recreated my symbolic math Lisp libraries into a Scala Math DSL (Domain Specific Language). Math equations were written in AsciiMath and parsed into Scala case classes for pattern matching and transformations that included differentiation, integration, simplification, evaluation and MathML for typeset equations in browsers. Showed the Scala Math DSL to Glaxo and was awarded a contract for integrating symbolic math into Glaxo's molecular modeling research.

4-Tier B2B at Axiom 2001-2006

From 1996-2001 my teams and I had become proficient in J2EE with XML transactions. So we leveraged our experience to build fully XML integrated portals. Started Axiom Architectures LLC in 2001

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| Time Warner | 2006 | Refactored J2EE, Struts, Web Logic and webMethods |
| Level3 | 2005 | Java Swing GUI and mentored developers for provisioning Level 3's VPN |
| EchoStar | 2004 | Build security in Web Logic for Pay per View services |
| IBIS | 2003 | Built a local search engine with business to consumer semantics |
| Avert | 2002 | Created a front end UI and performed load testing in JMeter for HR |
| Next Step | 2002 | Advised on web design and tracked user interest in Flash product catalogues |
| Digiterra | 2001 | Integrated AT&T, Time Warner, DirectTV, Sprint, Comcast with Circuit City |
| Fuel Base | 2001 | Prototyped a 4-Tier B2B portal in J2EE with Vitria to secure funding |

Med Unite Portal at XCare 2000-2001

My team built MedUnite's HIPAA XML transactions portal for Aetna, Cigna, Anthem, Wellpoint and PacificCare. Created Topic Maps in Ontopia that traversed medical documents with semantic relationships. Designed an integration tier with Vitria. Upgraded the solution architect methodology that passed a SAS-70 audit.

E-Commerce at DMR 1999-2000

Created a reference 4-Tier architecture for DMR's e-commerce practices and proposals. Formed strategic partnerships with Web Logic, Vitria and Cygent to reinforce 4-Tier integration within J2EE. Initiated projects for a team of 20 Java developers for 4-Tier sites at American Express and ICG. Captured the knowledge of DMR's Benefit Realization experts into Strategic, Governance and CMM practices. Combined DMR's benefits and 4-Tier for a complete methodology.

Chief Architect at Williams Communications 1996-1999

As Chief Architect for the Planning Group I defined and taught the company's enterprise architecture (Zachman). Cross referenced all of WCG's organizations, business processes, connectivity and data models. Created an enterprise data model and warehouse that included: marketing, sales, order, fulfillment, customer care and finance. Mapped the marketing data model into a Java Swing GUI and integrated it with Brio for the first BI / OLAP application. Led the first CRM integration (Neon) that established the planning group's credibility.

Incorporated Design Patterns into a distributed 3-Tier platform, taught seminars and authored the teams OO methodology. Key components included a fax-broadcast dispatcher, job monitoring, Internet and persistence. These components reduced development time by 1/3 in months for each platform: fax 9, invoice 6, audio 4 and video 3. Rewrote the video application in Java/Swing.

Telephony at Nortel 1992-1996

Developed and taught the Design Patterns and OO courses for switch developers at Bell Northern Research. The courses emphasized the GOF and POSA Design Pattern catalogs applied to DMS-100 switch architecture. Authored an OO handbook on how to implement the best features of OO.

Collaborated with NorTel's Object Center to define a methodology that merged OMT with OBA/CRC in 93. Within NorTel's BPR effort Central Order Database, led the Site Tracker and Loader Smalltalk/C++ projects for viewing and loading and switch configurations.

OO Designer for Fiber Vision that monitored DMS-100 Switches via a centralized network operations center. Classified 2100 DMS-100 log reports. Built OO databases and Smalltalk/C++ apps for the DMS-100 switch and SS7 network topology.

Scientific Research at Glaxo 1990-1992

Reengineered the experimental processes for Glaxo's pharmaceutical research division. Developed and taught C++/Lisp. Wrote libraries for symbolic math, relational tables and trace curve fit models. Built a visualization package in PV-Wave. Added a curve fit to Excel to create the scientific spreadsheet adopted by over 300 scientists. <<<<

GIS at Criterion 1987-1990

Designed and built LandTrak Plus, a complete Geographic Information System (GIS) for the telephone industry. In its time LandTrak was a major competitor in the PC GIS market with MapInfo and ESRI. LandTrak mapped street networks (Census Dime Files) for public safety and education. LandTrak Plus added an event driven GUI framework and persistent classes to dynamically query thematic data associated with graphically depicted map features. These capabilities enabled cable-transfer and loop-makeup that traversed telephone cable pair hierarchies. Prototyped a network topology for the connectivity and associativity of map features.

Reengineering at Telcor 1985-1987

Provided technical expertise to telephony experts who were tasked with reengineering the drawing and record management processes for outside plant and central office telephone networks. Wrote specifications for an integrated facility management system that combined CAD, GIS, and databases to manage assets of 14.5 billion dollars. During the study period my team gathered user requirements and interviewed over 30 CAD and GIS vendors. Coordinated a field trial with ESRI to demonstrate ARC / INFO's outside plant capabilities. Defined a design methodology that combined entity-relationship, state-transition and data flow diagrams.

CAD at UniCad 1984-1985

Worked with a start-up company on the design and programming of a CAD toolbox in C. The main product was called MPE for Modifiable, Portable and Extensible software. MPE consisted of subsystems for drafting, solid modeling (Romulus), customizable user interfaces (UIMS), device independent graphics (GKS), a relational database (Oracle), and a structured application language (SAL). My contributed 3D geometry, modeling and GKS.

Geology at Petroleum Information 1980-1984

My team at Petroleum Information designed GAS (Geologic Analysis System) with integrated graphics, data base, and statistics. GAS was the culmination of over four years of data collection, programming and analysis on Alaska's North Slope. These projects were researched, designed and coded in close collaboration with scientists at the USGS.

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| SDS | A complete multivariate statistics package with curve fitting, spreadsheet, data retrieval and graphics. |
| TECHSYS | An entire database system for oil well and production data. |
| DEMS | A digitized mapping system for oil well location and USGS DLG (Digital Line Graph) file formats. |
| TTI | An oil maturation and burial history package. |
| SRG | Markov Chains for modeling sedimentary transitions. |
| SEDAS | An earthquake recognition and location system in UNIX with the USGS branch of Global Seismology. |

Geophysics at Texas Instruments 1978-1980

At Texas Instruments I programmed wavelet-processing modules that utilized Fourier (frequency) and Hilbert (phase) transforms that sharpened fuzzy minimum phase wavelets to symmetric zero phase wavelets. Additional wavelet modules filtered marine air gun bubbles and reconstructed Vibroseis frequency sweeps. Designed a complete grid and contour system with geologic fault honoring.

Math Tutor and Instructor at Arapahoe Community 1974-1978 and 1980

At Arapahoe Community College I was a founding member of the Math Lab in 1974 which enrolled 300 student per year. The mission of the Math Lab was to encourage disenfranchised students with individual tutoring. I taught and developed course materials for 11 academic math courses from arithmetic up through calculus, differential equations, statistics and linear algebra. I contributed to the textbook Understandable Statistics now in its 11th edition authored by our lead instructor Corrine Brase (see <https://is.gd/4pY3vw>) In addition I supported 5 vocational courses and tutored physics, chemistry and biology. Administered teacher training, authorized course changes, supervised registration, and assisted in career counseling. In 1980 with my degree in the classroom I taught trigonometry and introduction to computer science with personal computers. Upon reflection the Math Lab was a significant milestone in my career because I experienced mentoring with positive feedback.

Academics at Colorado School of Mines 1973-1978

Mathematics courses: Differential Equations, Partial Differential Equations, Numerical Analysis, Integral Transforms, Real Variables, Complex Variables, Linear Algebra, Calculus I, II, III, Statistics, Probability, Operations Research and Linear Programming. Geophysics courses: Fourier Transforms, Potential Theory, Seismic Processing, Geology and Stratigraphy