Tom Flaherty

1900 Little Raven St., Suite 561, Denver CO 80202
Thomas.Edmund.Flaherty@gmail.com (720)-587-5017
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 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, California, XCare, DMR, Williams, NorTel and Glaxo. See: Humanistic Practices

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

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

Data Science Practices 2016

	Embrace	**Innovate**	**Encourage**
Learn	Acquire	Domain	Insight
Do	Machine	Model	Interpret
Share	Prove	Explain	Advise

The 9 data science practices are a work in progress that I defined and briefly taught to the IT group at the University of North Texas. These practices provide a humanistic context to Augment the human experience. Learning begins with Acquire, Domain Modeling and Insight that the provide context for Machine Learning, Math Modeling and Interpretation. Shared results are Proved and Explained to Advise our communities. See: Data Science Practices

Acquire	The collection, refinement and preparation of data as a shared resource
Domain	Tools, inquiries, schema and that form a working paradigm
Insight	Insight with intuition, theories, assessing uncertainty and choices
Machine	Guiding the training of machine learning techniques with feedback
Model	Cultivating statistical significant patterns based on math models
Interpret	Measuring signal and assessing uncertainty to simulate future outcomes
Prove	Diagnosing and evaluating algorithms to protect and recreate results
Explain	Enriching the rationale and context behind findings
Advise	Harvesting interpretations, explanations and ethics to publish viable decisions

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.

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 writen 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

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 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 associatively 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.

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 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 traumatized students with individual tutoring based on positive feedback. 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 this was the best job in my entire career because of the amazing collaboration with my colleagues and students.

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