

Sigfried Gold

Interactive Data Visualization Developer

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With 29 years developing data management and analysis software on Unix/Linux and web platforms, I now specialize in designing and implementing innovative, browser-based information visual analytics tools to facilitate the exploration and understanding of complex, multivariate or temporal data. I have experience in a wide array of industries (cyber security, securities trading, law, public sector administration, fundraising), but particular expertise in medical informatics and the secondary use of clinical and claims data for pharmacoepidemiology and patient safety research. My career dream is to transform the practice of secondary use of observational patient data by developing a suite of visualization tools to interactively explore and understand temporal patterns and other features in large repositories of patient medical records and claims.

Specific technical experience and skills include: rich internet applications (RIA) design and development using JavaScript, HTML5, and many supporting tools and libraries (D3.js, React, Angular, Lodash/Underscore, Knockout.js, Jasmine, Mocha, Vows, Karma, Testem, jQuery, Bootstrap, Require.js, Node.js, Bower, Browserify, Webpack, Grunt, Gulp); data analysis and software development using medical terminologies (ICD-9, MedDRA, UMLS, OMOP, RxNorm, 3M's HDD, FDB NDDF+, LOINC, SNOMED); data management, analysis, and graphics with Oracle 10g/11g, MongoDB, Elasticsearch, R, Excel; programming and user experience design for web and desktop applications using Python, CSS, XML, Perl, Apache, Tornado, Servlets, JSP, C/C++, Visual Basic, Linux shell scripting; Sybase, MySQL, PostgreSQL, SQL Server, DB2, Access; Git, CVS, Subversion, Eclipse, a host of Javascript, Perl and Python modules; Microsoft Office, Project, Visio; Balsamiq; Crystal Reports; LaTeX. Particular expertise with complex SQL, regular expressions, and ETL work. Committed vi/vim user since 1987.

Technical Experience

Infoviz Consulting, LLC and other contract engagements Visualization Programmer and Architect (February 2014 – present). Projects:

University of Colorado, Health Data Compass. Building innovative visualization tools for researchers using OHDSI/OMOP warehouse of Children's Hospital and UCHealth data. Served as visualization consultant and designed and prototyped new data quality visualization tools for PCORI grant.

OHDSI.org, Observational Health Data Sciences and Informatics. Built prototype for visual exploration of patient medical records. Presented poster at 2016 OHDSI Symposium. React, D3.js, Node, D3kit-timeline.

Johnson & Johnson, Janssen Pharmaceuticals. Built visualization tools into ATLAS, the primary Web interface for OHDSI and the OMOP Common Data Model: patient profile, graphical display of cohort definitions, generalized scatterplot module. Also added many utilities to aid in further ATLAS development. D3.js, Knockout.js, Java, SQL.

FasterCures. Software architecture consulting.

Gryphon Scientific for NIAID/NIH. Technical consulting, software design, software development. React, D3.js, Node, Python. Built interface for querying and annotating publication references from PubMed.

Altman Vilandrie, contracting through Toptal. Built generalized platforms for displaying marketing data analysis charts. D3.js, Flask, Dimple.js.

Invincea Labs for DARPA, CyberGenome. Design and implementation of complex, highly interactive tools for exploring and finding meaningful relationships in large collections of malware binaries. Data is massively multivariate and requires innovative approaches. Built highly customized network diagramming tools, scatterplots, and hive plots in addition to refactoring and generalizing data retrieval methods and tools for interactively associating any appropriate data dimension with the display dimensions of any given visualization. Using functional programming paradigms in Javascript (D3.js, angular, lodash) and Python (Tornado).

Social & Scientific Systems, Inc. Interactive Information Visualization Designer (October, 2011–Feb 2014). Designed static and interactive information visualization displays for scientific and operational data in the context of large clinical trials research. Designed software, focusing on user experience and the navigation of complex networks of multivariate data. Analyzed user needs and architected the integration of custom visual analytics tools into existing web applications managing large clinical trial network data. Presented innovative work on the exploration complex categorical data at <http://www.cs.umd.edu/hcil/eventflow/workshop2013/>. Built several open-source tools and libraries useful for general visualization tasks: <http://sigfried.github.io/>

Oracle Corporation (previously Phase Forward) Senior Systems Consultant (June 2008—September 2011). Designed and prototyped research software for discovering and validating drug safety signals in longitudinal healthcare data. Worked with DoD TRICARE data warehouse of 12 million patient medical records. Developed novel information visualization methods for discovering clinical patterns across thousands of timelines of longitudinal patient data. Wrote research proposals and results for academic publications and grant funding. Provided informatics expertise on managing data mining applications using various medical coding systems and classifications, such as ICD-9-CM, RxNorm, AHFS, FirstDataBank NDDF, LOINC, MedDRA, UMLS. Was Principal Investigator on \$100,000 external research grant collaborating with Ben Shneiderman and others of the University of Maryland's Human-Computer Interaction Lab through in developing novel methods for temporal summary and visualization of drug exposure and medical event data: <http://www.cs.umd.edu/hcil/eventflow/>. Presented innovative work on the representation and comprehension of complex drug utilization patterns in prescription and dispensing dispensing data: <http://www.cs.umd.edu/hcil/sharp/workshop2011/speakers.html>

Columbia University Medical Center Systems Consultant (January 2003—March 2008). Worked with researchers, neonatologists and administrators at the New York Presbyterian Hospital Regional Perinatal Centers (RPC) on quality assurance and research applications using neonatal intensive care unit data. The RPC has New York State-mandated data oversight responsibilities for 15 NICUs around New York City. Projects involved collection of data from multiple sources, including New York State's Perinatal Database System, New York City's and New York State's electronic birth certificates, Vermont Oxford, and the NICUs themselves. Projects also involved data cleanup, analysis, and experiment design and execution. Experiments were designed for the purpose of improving data quality.

Designed and built a highly interactive intranet, major gifts reporting platform and group communication system aiding 50 development professionals in raising \$150 million per year.

OJC Technologies/Pixo Founder, CIO (August 2008—January 2003). As founder led all aspects of soliciting and executing contracts: identified opportunities, made cold calls, did technical sales, wrote proposals, gathered requirements, staffed projects, designed solutions, wrote use-cases, ERDs, wire frames, managed implementation, testing, delivery, client training. Managed significant projects for

dozens of clients including UIUC/EvaluationOnline, Morgan Stanley Dean Witter, Imagine Media/Daily Radar, MortgageSelector, Trimark Securities, United States Geological Survey, Stats Inc., Fitch IBCA Duff & Phelps, McGraw-Hill, Illinois Department of Children and Family Services, Illinois Math and Science Academy, Music Browser Inc., Provena Covenant Medical Center, Psychics.com. Company grew from two employees in August 2008 to twenty two years later. Pixo (<http://pixotech.com/>) remains the leading web application development firm in Champaign-Urbana, Illinois, providing services to many departments and offices of the University of Illinois and other local business and organizations.

Tradetech Securities Programmer (March 1995—January 1998). Built multiple integrated reporting systems for third market trading firm: dynamic reports analyzed the firm's trading data to track order-flow, profitability, and regulation compliance.

Other contract and full-time software development work from 1986 to 1995: William M. Mercer, Inc., Sybase, Allstate Insurance Company, Holleb & Coff, Metropolitan Life Insurance Company, Dean Witter Reynolds, Victim Services Agency.

Education and Certifications

Columbia University, M.A. in Biomedical Informatics (2008)

Sarah Lawrence College, M.F.A. in Creative Writing (1987)

Goddard College, B.A. in Literature (1984)

Publications

Gold, Blacketer, Sena, and DeFalco. CHRONOS: Cohort exploration through individual patient profiles. Observational Health Data Sciences and Informatics Symposium, Washington, DC. 2016.

Gove, Saxe, Gold, Long, and Bergamo. SEEM: A Scalable Visualization for Comparing Multiple Large Sets of Attributes for Malware Analysis. In Proceedings of the 11th International Workshop on Visualization for Cyber Security. Paris, France. 2014.

Gold. "Interactive Visualization of Complex Clinical Research Metadata." 30th Human-Computer Interaction Lab Symposium. University of Maryland, 2013.

Gold. "Using Visualization to Explore Claims and EHR Data for Signal Strengthening." Drug Information Association Annual Meeting, Chicago, 2011.

Gold and Coster. "Visual Representation of Exposure Patterns in Drug Safety Research." 28th Human-Computer Interaction Lab Symposium, Electronic Health Record Informatics Workshop. University of Maryland, 2011.

Gold, Xie, Taylor, Szarfman and Coster. "A Sorting and Classification Method for Interactive Visualization of Drug/Event Patterns across Many Patient Timelines." 26th International Conference on Pharmacoepidemiology and Therapeutic Risk Management. Brighton, UK. 2010

Gold, Elhadad, Zhu, Cimino and Hripcsak. "Extracting Structured Medication Event Information from Discharge Summaries." American Medical Informatics Association Annual Symposium. Washington, DC. 2008. Received Distinguished Paper Award.

Zhu, Gold, Lai, Hripcsak and Cimino. "Using Timeline Displays to Improve Medication Reconciliation." International Conference on eHealth, Telemedicine, and Social Medicine: eTELEMED. 2009. Received Best Paper Award.

Kubick and Gold. "Safety in Numbers." Good Clinical Practice Journal. September 2008.