

Michael Travers

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Summary of Qualifications

- Creative approach to software and UI design
- Broad experience in scientific and medical applications
- Focused on knowledge management and intelligence amplification
- Ability to take technical leadership and management roles

Professional Experience

[Parker Institute for Cancer Immunotherapy](#), *Principal Software Engineer* 2018-present

Led development of knowledge management tools as part of the Translational Engineering team, including RawSugar, a system for storing, integrating, regularizing and semantically tagging genomic and other experimental data supplied by our remote collaboration sites; Enflame, a visual query builder for a graph knowledge base; and Alzabo, an ontology specification language and visualization framework. Supported scientists doing analysis of clinical trial data, including statistical modelling and visualization. Tools include: Clojure, ClojureScript, R, Datomic.

[Nuna Health](#), *Principal Software Engineer / Data Architect* 2017-2018

Led the development of a variety of data management systems, including a schema framework and a suite of tools for measuring, evaluating and monitoring data quality. The overall business objective of these tools was to reduce complexity and increase throughput of the healthcare analytics data pipeline. Eg, time to onboard a new client was reduced by approximately 30%, accomplished by automating manual processes and abstracting away redundant configuration. Worked with the Data Operations and Data Science teams to support their work. Contributed to architecture of next-generation platform (APIs, reusable components, microservices, high-level pipeline definition language). Led subteam doing work on data quality and usability. Tools include: Spark, Scala, Java, Python, Airflow, d3, Looker

[Vital Labs](#), *Principal Software Engineer / Director of Engineering* 2015-2016

Led the technical development of Orchestra, a platform for management of chronic disease and personal medical experimentation. The platform included a mobile app for patients, a web-based portal for physicians and administrators, and a data analysis pipeline. Worked with clinicians and designers to continually improve the platform. Developed a workflow formalism and engine for representing medical treatment patterns. Managed operations and deployment, security, regulatory compliance (HIPAA, FDA, engineering process capture). Tools include: Clojure, ClojureScript, Datomic, React, BigQuery, HazelCast

[Quixey](#), *Principal Software Engineer / Team Lead, Knowledge Engineering Group* 2013-2015

Team lead for semantic ingestion pipeline for a large search engine. Developed ontology management tools, Hadoop and Spark components for named entity extraction, entity normalization, and computation of search ranking parameters. Designer and owner of the knowledge base, developed an internal knowledge management website and API for surfacing knowledge to other components of the architecture and company. Designed and prototyped a variety of research systems to illustrate semantic search concepts. Contributed to the development of query understanding and ranking algorithms. Tools include Java, Hadoop, Pig, Spark, Luigi, RDF, graph databases, a variety of natural language libraries and resources.

[Collaborative Drug Discovery](#), *Principal Software Engineer* 2012-2013

Worked on small team developing a complex Rails application to support cloud-based pharmaceutical drug development research. Led development of the API, also created client software for integrating the CDD product into scientific workflows. Worked closely with product management to design new features

such as a notification feed. Contributed to grant writing and business development efforts. Researched and prototyped new user interface concepts. Participated in research efforts leading to scientific publications. Tools: Rails

SRI International, *Computer Scientist, Bioinformatics Research Group* 2010-2012

Research and developer for the BioCyc genomic database. Developed graph algorithms and an exploratory user interface for synthetic biology reaction pathfinding. Led the design and development of SmartTables, a web-based semantic spreadsheet for bioinformatics. Rebuilt the web platform underlying BioCyc to meet modern security standards and enable more dynamic user interfaces. Did outreach with the user community to define and refine new features. Tools: Common Lisp, d3, JavaScript

CollabRx/CommerceNet, *Director, Research and Development* 2007-2010

Lead architect, designer, and product manager for the CollabRx platform, which provides knowledge-based collaborative computing infrastructure for distributed medical research and personalized genomic medicine. Conducted research into knowledge and workflow representation for biomedicine; designed and built prototypes for web-based software platform to support collaboration among scientists working on therapy development. Designed and developed a tool to support doctor-patient communication. Tools: Common Lisp, R, Rails, Django, graph databases

IO Informatics, *Principle Software Engineer, Knowledge Systems* 2006-2007

Designed and developed tools for integrating and visualizing biological data for metabolomics, proteomics, and related domains, using semantic web technology. Took lead role in architecture, ontology, and product and user interface design of the company's flagship product. Tools: C#, RDF

Afferent/MDL/Elsevier, *Director, User Interface* 1999-2006

Developed applications for pharmaceutical drug discovery (combinatorial chemistry, LIMS, data integration). Responsible for user interface design, architecture, and implementation, including a sophisticated search tool. Other responsibilities included designing and implementing an object-relational mapping facility, and redesigning architecture for operation in a worldwide enterprise environment. Participated in project planning and management. After successful acquisition of Afferent, continued at MDL and later Elsevier as Principal Software Engineer and Architect. Developed applications for pharmaceutical drug discovery. Lead engineer/architect for the company's client-side platform and data integration strategy. Designed and implemented a visual form design and end-user programming system deployed to consultants and customers. Developed ontology and protocols to unify cheminformatics data across applications.

IBM Research, *Research Scientist* 1997-1999

Worked with the Java Tools research group designing advanced interactive programming and visualization tools; explored agent-based component architectures. Worked on XML-related application tools and contributed to schema and query standards efforts. Developed web-based knowledge management tools for corporate intranet.

Centre Mondial Informatique et Ressources Humaine, *Senior Research Engineer* 1985-86

Designed and implemented a knowledge base and graphic editor for a medical diagnostic expert system for use on portable computers in third-world countries.

Consulting 1988-present

Offering part-time consulting services in knowledge representation, end-user programming, and human-computer interaction for a variety of clients, including MCC, Apple, [Science Commons](#), [Nixle](#), and [IS Robotics](#).

Technical

Experienced in design and implementation at all levels from operating system internals to user interfaces. Languages: Java, C#, Ruby/Rails, Common Lisp, Clojure, ClojureScript, React, JavaScript, Python. Internet standards: TCP, HTML, HTTP, CSS, XML, JSON, SVG, REST, RDF/OWL. Databases: MySQL, Oracle, Elastic Search, Cassandra, Datomic. Tools: Git, Selenium, Hudson/Jenkins, CircleCI. Deployment/Cloud: EC2, Google Cloud, Heroku, Docker. Visualization: d3.js, vega. Big Data: Hadoop, Pig, Spark.

Selected Publications

Introduction to *Inventive Minds: Marvin Minsky on Education*, ed Cynthia Solomon and Xiao Xiao, 2019

[Groups: Knowledge Spreadsheets for Symbolic Biocomputing Database](#) 2013 (w. Suzanne Paley et al)

[Accurate Atom-Mapping Computation for Biochemical Reactions](#), *Journal of Chemical Information and Modeling* 2012 (w. Mario Latendresse et al)

[A Melanoma Molecular Disease Model](#), *PLoS ONE*, 2011 (with S. J. Vidwans, K. T. Flaherty, D. E. Fisher, J. M. Tenenbaum, and J. Shrager)

[Politics and Pragmatism in Scientific Ontology Construction](#), Proceedings of the First International Symposium on Inconsistency Robustness, 2011.

[BioBIKE: A Web-based, programmable, integrated biological knowledge base](#). *Nucleic Acids Research*, 2009 (with J. Elhai, A. Taton, J.P. Massar, J.K. Myers, J. Casey, M. Slupesky, and J. Shrager).

[A Brief Overview of the Narrative Intelligence Reading Group](#). In *Narrative Intelligence*, eds. Michael Mateas and Phoebe Sengers, 2003. (with Marc Davis)

[Recursive Interfaces for Reactive Objects](#), *Proceedings of CHI '94*, in Boston, 1994.

[Two Approaches to Informal Interaction Over Computer and Video Networks](#). In *Proceedings of CHI 1991* (with Alan Borning)

[A Visual Representation for Knowledge Structures](#). In *Proceedings of Hypertext '89*, 1989.

Animal Construction Kits. In *Artificial Life: SFI Series in the Sciences of Complexity*, ed. C. Langton. Addison-Wesley, 1988.

Education

[MIT Media Laboratory](#), Ph.D. in Media Arts and Sciences

Research in programming environments, languages, and agent-based systems. Co-founded Narrative Intelligence Group. Dissertation title: [Programming with Agents: New metaphors for thinking about computation](#). Nominated for ACM Doctoral Dissertation Award. (1996)

[MIT Media Laboratory](#), S.M. in Visual Studies

Research in programming environments, behavior simulation, and artificial life. Thesis title: [Agar: An Animal Construction Kit](#), 1988

[Massachusetts Institute of Technology](#), S.B. in Mathematics, 1986

Miscellaneous

Coding in Place, Stanford, volunteer section leader, 2020

[BACE Timebank](#), technical advisor, 2010-2013

[Behave!](#), visual programming system for the Virtual Fishtank exhibit, The Computer Museum, Boston, 1998.

[The Electric Anthill](#), SIGGRAPH Art Show, 1989