Michael SOLLAMI

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I am passionate about creating innovative software solutions to complex problems across industries. After completing my doctorate I worked as a data scientist, principal engineer, and product director at multiple publicly traded software companies. I now lead development teams to solve real-world problems with new technologies and machine learning applications.

Summary of core strengths :

- > Depth of experience in leading research and development teams on large-scale system engineering projects
- > State-of-the-art knowledge of AI technologies with an emphasis on deep networks and their applications
- > A deep passion for delivering next-generation products through innovative problem-solving and strong leadership

Professional Experience

2018 - Now | Principal Member of Technical Staff, Salesforce, Cambridge, MA

At the innovation group of Salesforce Einstein I lead advanced projects in applied deep learning.

- > Developed generative design technologies for automatic content creation
- > Designed and built end-to-end retrieval systems for visual search and understanding
- Created new architectures for multimodal natural language tasks including product description generation, textual style transfer, and user-level content personalization
- > Led engineering initiatives to optimize both user engagement metrics and revenue globally

Product Strategy | Engineering Management | Cloud Compute Infrastructure | Applied ML Research |

2017 - 2018 | Data Science Director, Shutterstock Inc, New York, NY

As a founding member of the computer vision research team at Shutterstock, I designed deep neural systems for various core imaging applications.

- > Prototyped various AI technologies to improve the company's search platform
- > Implemented and deployed detection and attribute recognition services
- > Designed optimized containers and orchestration for serving machine learning APIs

Custom AI Solutions Search & Recommendation ML/CV Research Data Analytics Agile/Scrum Management

2014 - 2017 | Chief Scientist, Ditto Labs, Cambridge, MA

I led the team that brought deep learning and image recognition to internet-scale in Ditto's social media listening service and cloud APIs.

- > Provided technical leadership for product design and systems architecture
- > Developed proprietary distributed neural network training framework
- > Designed and implemented an active learning system for bootstrapping classifier ensembles
- > Achieved scaling needed to analyze petabytes of images in real-time

Head of Research Executive Director of Engineering AWS System Architecture ML/Dev Operations

2012 - 2014 | Lead Engineer of Research & Development, Mustbin Inc, Boston, MA

At Mustbin, I directed research and development of an ultra-private social network using a novel cryptosystem for iOS/OSX and Android - the world's first "NSA-proof" cloud-based data storage and sharing system.

- > Designed and tested our patented crypto-system, which was given the highest possible rating by security advisor Matasano (now NCC)
- > Implemented networking and cloud synchronization architectures with restful and thread-safe design patterns
- > Received multiple technology commendations along with the prestigious MITX award for the *Most Innovative App of 2014*

Product Management Crypography Swift/iOS/XCode Python/Django Java/Android

2012 | Flagship Exhibit, The National Museum of Mathematics, New York, NY

As the principal member of flagship exhibit design team and I oversaw development and the onsite installation of the exhibit for the grand opening.

- > Coded the graphics engine powering the exhibit's interactive console
- > Resolved major performance issues by implementing fast polyhedron boolean operators in Java
- > Integrated custom built electronics by writing custom firmware

Product Design QT Design Firmware Development

2009 - 2012 | Lead Research Engineer, Wolfram Research Inc, Cambridge, MA

As a senior member of Stephen Wolfram's Advanced Research group I was tasked with engineering core functionalities for Mathematica and Wolfram|Alpha.

- > Created the query recognition system and the NLP interpreter powering Apple's Siri and Microsoft's Bing services for quickly answering questions involving scientific data and/or mathematical entities and operations (e.g. step-by-step answers, group).
- > Principal developer of the automated data analytics tool Wolfram Alpha Pro.
- > Prototyped novel data science visualization capabilities and designed automated statistical report generation and intelligent summarization tools.
- > Taught at the Wolfram Science summer schools intense research boot camps exploring computational methods in Wolfram's monogram "A New Kind of Science".

Natural Language Processing Automatic Data Mining C/C++ Go Wolfram Language

2008 - 2009 Senior Software Engineer, Goddard Space Flight Center, Greenbelt, MD

At NASA's Formation Flying Test Bed (FFTB) I worked on the Magnetospheric multiscale mission (launched in 2015) developing software to simulate and analyze formation flying satellites.

- > Simulated the dynamics of the geo-space environment in order to test the satellite communication systems on land
- > Ensured the correctness of onboard systems by accounting for relativistic clock effects

C/C++ Python/Scipy Linux Data Science Image Processing

2006 - 2007 Quantitative Analyst, Warisan Capital LLC, Westport, CT

As leader of the quantitative division at Warisan Capital (a globally mandated hedge fund of funds) I oversaw the statistical analyses of our holdings.

- > Developed time series modeling and portfolio stress testing using C++ and GTK
- > Designed proprietary financial engineering metrics and fund allocation methods
- > Held broker license certifications (Series 7 & 63)

Backtesting Strategies Portfolio Optimization Risk Simulations C/C++/Symbolic C++ Python/Matlab

Selected Publications

A selection of my public writings in journals, conferences, and other media is given here. For a complete listing of my publications, please visit : sollami.ai/published.

- > M. Sollami, J. Aashish, Multimodal Conditionality for Natural Language Generation, ICPR 2021, arXiv:2109.01229v1
- > M. Sollami, X. Peng, XFBoost : Improving Text Generation with Controllable Decoders, 2022, arXiv:2202.08124
- > M. Sollami, Learning Without Labels Article, Research Blog Salesforce AI, June 2021
- > M. Sollami, Improving Graph Networks with Transformers, Research Article Salesforce AI, March 2021
- > M. Sollami, A. Raffiee, GarmentGAN : Photo-realistic Adversarial Fashion Transfer, 2020, arXiv:2003.01894
- > M. Sollami, C. Douglas, M. Liebmann, An Improved Lower Bound for n-Brinkhuis k-Triples, 2016, arXiv:1606.00835
- > M. Sollami, Novel Graph Approximation Algorithms, 2013.

Patents

For a complete list of allowed and pending applications see patents.google.com/?inventor=michael+sollami.

- > Automatic User Interface Data Generation, U.S. 17/147,053
- > Systems and methods of natural language generation for electronic catalog descriptions, U.S. 17/067,000
- > Systems and Methods of Generating Photorealistic Garment Transference in Images, U.S. 17/091,259
- > Systems and Methods of Generating Color Palettes with a Generative Adversarial Network, U.S. 17/091,259
- > A Method for Efficient and Scalable Multicolor Search, U.S. 030730-4427
- > Systems and methods of image-based neural network apparel recommendation, U.S. 16/594,257
- > Machine-learning based generation of text style variations for digital content items, U.S. US17/067,000
- > Training data generation for visual search model training, U.S. 16/658,327
- > The Bin Enabled Data Object Encryptions and Storage Apparatuses, Methods, and Systems, U.S. 15/180,036

Selected Talks

A selection of public speaking engagements at recent conferences, workshops, and symposia is given here. For a complete listing of my talks, please visit : sollami.ai/talks.

- > A Bag of Superfunctions for Machine Learning, Wolfram Tech Conference, 2021
- > Controlling Large Language Models for E-Commerce, Rework Deep Learning, 2021
- > The Future of NLP in e-Commerce : Generative Multimodal Language Models, AI in Retail Summit, 2021
- > Building Next-Generation Visual Search at Salesforce, Open Science Data Conference, ODSC West, 2020
- > Recent Developments in Computational Photography, Boston Deep Learning Summit, Cambridge MA, 2019

Accolades

- > UX Design Award 2020. Einstein Designer Powered by Deep Learning UX won a nomination for the UX Design Awards 2020.
- > Fast Company's 2020 Innovation by Design Awards. Finalist in the Data Design category and an honorable mention in the General Excellence category for *Einstein Designer*.
- > Leader of the winning team for the State Department's annual **Fishackation in 2018** a global competition for using technology to defend life in our oceans.
- > Repeat first and second place winner of the **One-liner Programming Competition** from Wolfram Research Inc, in the years 2021, 2000, 2016, and 2014.

Competencies

Overall Expertise :	Delivering ML-powered/enhanced products all the way from ideation to customer-facing production- level applications. <u>Core Areas</u> : <i>Engineering and management</i> ; <i>Productization of ML Technologies</i> ; <i>Automatic/predictive</i> & generative AI solutions
People Leadership :	End-to-end delivery of novel solutions involving alignment with multiple clients and stakeholders; Directing high-impact projects requiring both innovation and cross-organization collaboration. <u>Core Values</u> : Strategic data-driven mindset; effective communication & strong leadership; coach- player hybrid ability in technical expertise and management; a passion for magical products
Innovation Areas :	Applied AI for Software Companies and Industries (fintech, e-commerce, astronautics, biotech, etc.) <u>Core Areas</u> : Automatic content generation; ML for edge computing; AI-focused HCI/UX/UI Design; ad- vanced methodologies in Graphics/Imaging; AR/VR/3D Applications
Deep Learning :	Manual and Auto ML modeling methodologies; Compression, optimization, and deployment strate- gies; AI interpretability; Multimodal content synthesis; Reinforcement and agent-based learning <u>Frameworks</u> : <i>Torch/Tensorflow/TF.js, ONNX/CUDA/Triton, huggingface/etc.</i>
Data Science :	Online learning for personalization and content recommendation; multi-arm contextual bandits; real-time event detection analysis; time series based prediction <u>Frameworks</u> : <i>Scipy, OpenCV, XGBoost, SQL/NoSQL, Spark/Arrow, D3/ThreeJS, Mathematica</i>
Cloud :	Amazon Web Services, Google Compute Cloud, Azure, Lambda, Softlayer <u>Core Services</u> : <i>S3, EC2/ECS/EKS, Elastic Search, Colab, BigQuery, GKE, etc.</i>
Languages :	Python/Cython, JS, Wolfram, Rust, Julia, Go, R, Clojure/Lisp, C/C++, C# <u>Frameworks</u> : <i>REST, WASM, Open/WebGL/GLSL, MPI, OpenMP/CL, Zero/RabbitMQ</i>

➢ Education

2012	 PhD in Mathematics - University of Wyoming Completed a dissertation in theoretical computer science with Professor Craig Douglas Graduated with a GPA of 4.0/4.0
2009	 Master of Science in Mathematics - University of Wyoming > Recipient of the Most Outstanding Graduate Major Award > Recipient of the Steven Lane Ashley Scholarship
2006	 Bachelors of Science in Computer Science and Mathematics - Trinity College First student ever to graduate with dual honors in three years Graduated Summa Cum Laude (7th in class) with a GPA of 3.98/4.0 Inducted into the Phi Beta Kappa Society Recipient of the Phi Gamma Delta Mathematics Prize Recipient of the UCF Computer Vision Research Fellowship
2003	 Storm King Preparatory School Class Valedictorian Graduated in 3 years with a GPA of 4.0/4.0

66 References

Available upon request.