Ramraj Velmurugan

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Technical skills

Advanced (>1000 hours):

- Data pipeline development (Python, Airflow, Spark)
- Data warehousing (AWS Redshift, Snowflake)
- Data analytics & sklearn based ML modeling (Python)
- Database management (PostgreSQL)
- Web-app/dashboard development (d3.js, dc.js)

Other technologies:

- Programming in JavaScript, C, Java, VB and ASP
- Experience with AWS, GCloud & Azure
- Deploying Spark clusters using docker and kubernetes
- Experience in web design & desktop publishing

Experience

Data Science Contractor, D-Theory Services *Oct 2019 – present*

- Provide tech-lead and data science contract services to Komodo Health on data analytics product
- Optimize and contribute data pipelines to the client's data warehousing platform spanning over AWS Redshift and snowflake

Data Scientist at Komodo Health, New York *2018 – Oct 2019*

- Worked as a "full stack data scientist" – fully developing a data analytics tool from prototype to forming a team and being tech-lead of commercial product with > $10M ARR
- Created a generalized metrics framework to monitor the quality of data passing through various data pipelines
- Created an internal dashboard allowing visualization of terabytes of data using dc.js and highly optimized Redshift indexes
- Developed and productionalized new entity resolution models for previously manually curated data entities
- Developed tree-based ML models that perform entity classification and categorization at scale

Fellow at Insight Data Science, New York *Sep – Dec 2017*

- **Created TweetMap.live to geolocate and visualize tweets during natural disasters**
  - Engineered a fault-tolerant tweet stream-processing pipeline on Google Cloud that also runs random forest models
  - Collected 18 million tweets about Hurricane Irma, extracted their location from the text and visualized them on a map

Graduate Research Assistant at UT Southwestern Medical Center, Dallas *2009-2017*

- 3D super-resolution microscopy data-processing (smlm.ramrajv.com)
- Multidimensional imaging data visualization and analysis (mila.ramrajv.com)
- Consulting for statistics, curve fitting and image processing in academic projects

Projects

Co-founder of inferalpha.com, a book-lending startup *2014-2017*

- Implemented the front- and back-end of a children's books-subscription site using ASP and Azure SQL, hosted using Microsoft's BizSpark program
- Implemented payment and inventory management sites for the company administration

Academic software development *2009-2017*

- Worked as part of the UI and software development team for Microscopy Image Analysis Tool (wardoberlab.com/software/miatool), for advanced multidimensional data visualization and processing

Development of two Android apps & publication to the Google Play Store (pebble.ramrajv.com) *2013-2014*

Education

***PhD*, Biomedical Engineering** *2009-2017*
The University of Texas Southwestern Medical Center at Dallas, TX.

***Master of Science*, Molecular Biology** *2008-2009*
Institute for Research in Immunology and Cancer, Université de Montréal, Canada.

***Bachelor of Technology,* Industrial Biotechnology** *2004-2008*
AC College of Technology, Anna University, Chennai, India

Publications

Microscopy data analysis:

- Sage D, Pham TA, … Velmurugan R, … Holden S. (2019) Super-resolution fight club: assessment of 2D and 3D single-molecule localization microscopy software. **Nat Meth** 16 (5): 387 (7th of 20 total authors).
- Lin D, Lin Z, Cao J, Velmurugan R, Ober RJ, Ward ES. (2019) A two-stage method for automated detection of ring-like endosomes in fluorescent microscopy images. **PloS one** 14 (6).
- Velmurugan R, Chao J, Ram S, Ward ES, and Ober RJ. (2017) Intensity-based axial localization approaches for multifocal plane microscopy. **Optics Exp** 25(4): 3394-3410.
- Chao J, Velmurugan R, You S, Kim D, Ward ES and Ober RJ. (2017) Remote focusing multifocal plane-microscopy for the imaging of 3D single molecule dynamics with cellular context. **Proc SPIE** 10070.
- Lin D, Lin Z, Velmurugan R, Ober RJ. (2017) Automatic endosomal structure detection and localization in fluorescence microscopic images **IEEE Trans Circuits Syst 2017**.

Cell biology:

- Velmurugan R, Ramakrishnan S, Kim M, Ober RJ, Ward ES. (2018) Phagocytosis of antibody-opsonized tumor cells leads to the formation of a discrete vacuolar compartment in macrophages. **Traffic** *(accepted)*
- Hyenne V, Tremblay-Boudreault T, Velmurugan R, Grant BD, Loerke D, Labbé JC. (2012) RAB-5 controls the cortical organization and dynamics of PAR proteins to maintain *C. elegans* early embryonic polarity. **PLoS ONE** 7(4): e35286.

Therapeutic antibody biology:

- Challa DK, Wang X, Montoyo HP, Velmurugan R, Ober RJ, Ward ES. (2019) Neonatal Fc receptor expression in macrophages is indispensable for IgG homeostasis. **mAbs** 11(5): 848-860.
- Velmurugan R, Challa DK, Ram S, Ober RJ, Ward ES. (2016) Macrophage-mediated trogocytosis leads to death of therapeutic antibody-opsonized tumor cells. **Mol Cancer Ther** 15(8):1879-89.
- Li R, Chiguru S, Li L, Kim D, Velmurugan R, Kim D, Tian H, Schroit A, Mason R, Ober RJ, Ward ES. (2017) Targeting phosphatidylserine with calcium-dependent protein-drug conjugates for the Treatment of Cancer. **Mol Cancer Ther** *(accepted)*.
- Challa DK, Velmurugan R, Ober RJ, Ward ES. (2014) FcRn: From Molecular Interactions to Regulation of IgG Pharmacokinetics and Functions. **Curr Top Microbiol Immunol** 382:249-72. *(Book chapter)*
- Ward ES, Velmurugan R, Ober RJ. (2014) Targeting FcRn for therapy: from live cell imaging to in vivo studies in mice. **Immunol Lett** 160(2): 158-62.
- Bansal P, Khan T, Bussmeyer U, Challa DK, Swiercz R, Velmurugan R, Ober RJ, Ward ES. (2013) The encephalitogenic, human myelin oligodendrocyte glycoprotein-induced antibody repertoire is directed toward multiple epitopes in C57BL/6-immunized mice**. J Immunol** 191(3): 1091-101.