Michael Walton

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Education

- **M.S. Georgia Institute of Technology** — Atlanta, GA
  Computer Science, Machine Learning Specialization — *2015 – 2017*
- **B.S. University of California Santa Cruz** — Santa Cruz, CA
  Cognitive Science, Cum laude with Highest Honors — *2010 – 2014*

Work Experience

- **Thinkful** — New York, NY
  Data Science Mentor — *Nov 2018 - Present*
  - **Mentorship & Teaching**: Technical instruction in statistics fundamentals, linear algebra, optimization and machine learning. Student capstone projects oversight
  - **Curriculum Development**: Expansion and supplementation of Thinkful prepatory and core Datascience Bootcamp curriculum
- **Space and Naval Warfare Systems Center** — San Diego, CA
  Research Scientist — *Oct 2015 - Present*
  - **Multi-Agent Reinforcement Learning**: Coordination, communication and state representation learning with applications to multi-UxV distributed control
  - **Model Compression**: Pruning, factorization and weight quantization to reduce model complexity for low-SWaP robotics and edge computing applications. Developed python package for simplifying trained tensorflow and Keras models
  - **Radio Frequency Signals Analysis**: Generative and discriminative modeling of RF timeseries data using Convolutional, Recurrent and Mixture Density Networks; applications to modulation classification, symbol-rate estimation and anomaly detection.
  - **Mine-like Object Detection**: CNN-based mine recognition system for UUV side-scan sonar data. Weakly-supervised target segmentation using Class Activation Maps
- **Specific Technologies** — Mountain View, CA
  Software Engineer; Data Scientist — *July 2014 - Oct 2015*
  - **Bacterial Species Classification**: Imaging and analysis of high-dimensional Colorimetric Sensor Array (CSA) metabolic signature data; species prediction using Random forests and multinomial logistic regression
  - **Bacterial Growth Detection**: Feature-selection and changepoint detection pipeline which improved consistency and performance of bacterial growth detector while minimizing false positives.
  - **SpecID Instrument Control System**: Incubator control logic and microcontroller-based PID stir speed regulator. Drastically improved data quality by reducing cross-sample growth variability and preemptively terminating misconfigured experiments
  - **Data Collection and Automation**: Instrument imaging and measurement synchronization with postgres relational database, Amazon S3 and NAS backups. Integrated with production analytics pipeline incorporating Python and R statistical tools and automated report generation with R Markdown and Shiny
- **Cognitive Modeling Laboratory, UC Santa Cruz** — Santa Cruz, CA
  Research Assistant; Advisor: Travis Seymour PhD. — *Dec 2012 - July 2014*
  - **Executive Process Interactive Control**: Extensions to Computational Cognitive Architecture visual system enabling bottom-up saliency and production rule control of visual attention
  - **Visual Attention Modeling**: Human performance models of strategic covert visual attention based on experimental reaction time data. Improved plausibility of cognitive architecture on Eriksen Flanker and simulated driving tasks.
- **V&P Scientific** — San Diego, CA
  Software Engineer — *Summer 2012 and 2013*
  - **Laboratory Robotics**: Developed custom software and electro-mechanical laboratory automation solutions for mixing, stirring and liquid transfer.
  - **Experiment Notification Service**: Extended instrument interface application with email and desktop notification services indicating system status and run completion.

Software & Tools

- Extensive Python scientific and statistical computing experience (numpy, scipy, pandas, jupyter etc.)
- Numerous machine learning projects varying in scale and complexity using contemporary frameworks for deep neural networks such as tensorflow, theano, keras, pytorch
- Production and experimental analytic pipeline development experience utilizing relational & NoSQL databases, MapReduce, Hadoop, Pig, MATLAB, R, Java, C#, C++, .NET

Selected Publications

- Hung F., Xie X., Fuchs A., **Walton M.**, Qi S., Lange D., Zhu S.C. (2019) *Intention-based Behavioral Anomaly Detection* AAAI Plan, Activity, and Intent Recognition Workshop
- **Walton M.**, Migliori B., Reeder J. (2018) *Distributed Consensus Deep Reinforcement Learning with Unreliable Communication* IJCAI Autonomy in Teams Workshop
- **Walton M.**, Migliori B., Reeder J. (2018) *Measuring Strategic Coordination in Multi-Agent Autonomous Systems* NDIA Human Systems Conference
- **Walton M.**, Migliori B., Gebhardt D. (2017) *Unsupervised Anomaly Detection for Digital Radio Frequency Transmissions.* IEEE ICMLA
- Gebhardt D., Parikh K., **Walton M.**, Dzieciuch I., (2017) *Hunting for Mine-like Objects with Deep Neural Networks*, IEEE OCEANS
- **Walton M.**, Lange D., Zhu S.C. (2017) *Inferring Context in Scene Understanding* AAAI Symposium on Computational Context
- **Walton M.**, Ayache M., Straatemeier L., Gebhardt D., Migliori B. (2017) *Learning to Generate RF with Recurrent Mixture Density Networks* Naval Applications of Machine Learning
- Straatemeier L., Barkatullah Z., **Walton M.**, Gebhardt D., Migliori B. (2017) *Data Augmentations for Asynchronous Radio Frequency Modulation Classification* Naval Applications of Machine Learning
- Ayache M., **Walton M.**, Straatemeier L., Gebhardt D., Migliori B. (2017) *Long Short-Term Memory Networks for Online Modulation Classification* Naval Applications of Machine Learning
- Wroblewski R., **Walton M.**, Manukain H., Culkin R. (2017) *Activity Identification and Vehicle Classification by Behavioral Analysis of Kinematic Data.* NSSDF
- Gebhardt D., Migliori B., L. Straatemeier, **Walton M.** (2016) *Radio Signal Augmentation for Improved Training of a Convolutional Neural Network*, Defense Technical Information Center
- **Walton M.**, Migliori B., Gebhardt D., L. Straatemeier (2016) *Learning and Visualizing Modulation Discriminative Radio Signal Features*, Defense Technical Information Center
- Migliori B., Gebhardt D., L. Straatemeier, **Walton M.** (2016) *Model-free Noise Reduction of Radio Transmissions with Convolutional Autoencoders*, Defense Technical Information Center
- Rhodes P., **Walton M.**, (2015) *Quantifying the Utility of Artificial Neural Circuitry.* Neurally Inspired Computational Elements (NICE)
- **Walton M.** (2014) *A Computational Model of Goal-Directed Visual Attention.* Undergraduate thesis, advised by Professor Travis Seymour, UCSC