

## Address

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## Tel & Skype

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AKAndyKeller

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## Git

Personal: akandykeller  
Work: andy-nervana

## Programming

Python ★★★★★  
Matlab ★★★★★  
C/C++ ★★★★★  
SQL ★★★★★  
JavaScript ★★★★★  
R ★★★★★

## Packages

Python  
PyTorch, Tensorflow,  
Matlab, Scikit-learn,  
Pandas, Numpy, SciPy  
C++  
CUDA, Armadillo  
JavaScript  
D3.js

## Interests

Representations,  
Equivariance,  
Information Theory,  
Cognitive Science

## Languages

English ★★★★★  
French ★★★★★

## Personal

SCUBA Diving,  
Snowboarding,  
Overseas Experience  
(France - 2.5 Years)

# T. Andy Keller

## Machine Learning Researcher

## Education

'18 - (Expected) '22 **Ph.D. Machine Learning and Deep Learning** [University of Amsterdam](#)

Supervisors: Professor Max Welling

Focus: Probabilistic Generative Models, Equivariance, Semi-supervised learning

'15 - '17 **M.S. Computer Science**

[University of California San Diego, La Jolla, CA](#)

Supervisor: Professor Garrison Cottrell

Related Coursework: Learning Theory, Embeddings, Statistical Learning, Neural Networks

'11 - '15 **B.S. Computer Science w/ Honors**

[California Institute of Technology, Pasadena, CA](#)

Related Coursework: Machine Learning, GPU Programming (CUDA), Stochastic Modeling

## Experience

September '17 - September '18 **Deep Learning Data Scientist** [Intel Nervana, San Diego, CA](#)

- Facilitated algorithmic solutions for Intel's partnership with Ferrari Challenge North America
- Assisted development of Intel's internal deep learning frameworks neon and nGraph
- Implemented NLP models for the Intel AI Lab NLP Architect open source repository

June '16 - June '17 **Algorithms Engineer Intern**

[Intel Nervana, San Diego, CA](#)

- Completed implementation of Faster-RCNN object localization model in Neon, including adding custom layers. Tuned architecture to match published performance.
- <https://github.com/NervanaSystems/neon/tree/master/examples/faster-rcnn>
- Worked directly with clients including global financial service providers and manufacturing groups to implement novel neural network solutions to data science problems.

Winter '16 **Data Visualization Teaching Assistant**

[University of California, San Diego, CA](#)

- Designed homework assignments, demos, and class tutorials for D3.js & Bokeh.
- Class exercises: <https://mas-dse.github.io/DSE241/exercises/>

Summer '15 **Data Science for Social Good Summer Fellow**

[University of Chicago, IL](#)

- Analyzed data related to 1.5 million Mexican home loan mortgages (>500 GB) to determine the personal and environmental influences of home abandonment in Mexico.
- Delivered a risk-of-abandonment model with 600+ features to our partner, Infonavit, improving their ability to preemptively identify risky loans by 17% over in-house metrics.
- Project page: <https://goo.gl/touSWT>
- Presented paper based on the work at KDD 2016 Applied Data Science Track

Summer '14 **Analytics Engineering Intern**

[Lyve Minds Inc., Cupertino, CA](#)

- Developed supervised learning algorithm for automatic editing and summarization of user generated handheld video based on predicted level of interest.
- Two patents based on work: 20160071549, 20160080835

Summer '12 **Undergraduate Researcher (Applied Physics)**

[Caltech, Pasadena, CA](#)

- Researched the effect of interface materials on an acoustic lens in the production of "Sound Bullets", co-author of paper based on work.
- Gathered and analyzed waveforms from the lens to find trends in data and determine optimal characteristics of interface materials.

## Publications

*arXiv Preprint '18   Fast Weight Long Short-Term Memory*

- **T. Keller**, S. Sridhar, X. Wang. Fast Weight Long Short-Term Memory. *arXiv:1804.06511*. 18 Apr 2018.
- <https://arxiv.org/abs/1804.06511>

*KDD '16   Designing Policy Recommendations to Reduce Home Abandonment in Mexico*

- K. Ackermann, E. Reyes, S. He, **T. Keller**, P. van der Boor, R. Kahn. Designing Policy Recommendations to Reduce Home Abandonment in Mexico. *Proceedings of the 22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*. Pages 13-20. 13 Aug 2016.
- <http://www.kdd.org/kdd2016/papers/files/adf0913-ackermannA.pdf>

*APL '14   Experimental Realization of a Nonlinear Acoustic Lens with a Tunable Focus*

- C. Donahue, P. Anzel, L. Bonanomi, **T. Keller**, C. Daraio. Experimental Realization of a Nonlinear Acoustic Lens with a Tunable Focus. *Appl. Phys. Lett.*, 104,014103. 9 Jan 2014
- <https://arxiv.org/abs/1308.1483>

## Patents

March '16   *Synopsis Video Creation Based on Relevance Score*

- <http://www.patentsencyclopedia.com/app/20160071549>

March '16   *Synopsis Video Creation Based on Video Metadata*

- <http://www.patentsencyclopedia.com/app/20160080835>

# Projects

*Summer '17 - Summer '18*    **Ferrari Challenge Tracking and Classification**    [Intel AI Lab](#)

- Scoped and prototyped initial solution for augmented Ferrari Challenge drone broadcast.
- Closely collaborated with diverse teams across Intel to deliver live-inference pipeline for tracking and fine-grained classification of race cars from few labeled examples.
- Managed collection of a novel dataset for localization, tracking and classification.
- Trained and modified SSD model to deployment level accuracy on small objects.
- Implemented Matching Network for few-shot classification of race cars to work with SSD.
- Presentation: [https://youtu.be/pSZn\\_\\_bYA1k?t=3990](https://youtu.be/pSZn__bYA1k?t=3990)
- Blog: <https://goo.gl/PmQss8>
- TWiML Podcast: <https://goo.gl/6NeMnp>

*Winter '17*    **Fast Weight Long Short-Term Memory**    [Intel AI Lab / Personal](#)

- Developed and experimented with multiple novel Fast-Weight LSTM architectures to characterize synergistic effects between gated RNNs and fast weight associative memory.
- Re-implemented Fast-Weights to Attend the Recent Past (Ba et al.) and Gated Fast-Weights for On-The-Fly Neural Program Generation (Schlag et al.).
- Showed faster learning and increased accuracy on associative recall tasks.
- Showed near equivalence with Memory Network attention mechanism on bAbI QA tasks.
- Preprint: <https://arxiv.org/abs/1804.06511>
- Git: [https://github.com/akandykeller/fast\\_weights](https://github.com/akandykeller/fast_weights)

*May '18*    **Intel AI Lab NLP Architect**    [Intel AI Lab](#)

- Implemented end-to-end memory network for question answering and goal oriented dialog systems in nGraph. Replicated published results. Open sourced models in Intel AI Lab NLP architect.
- Git: <https://goo.gl/gYcJiQ>
- Implemented custom time-distributed recurrent and LSTM layers to facilitate character-level word embeddings in neon.
- Git: <https://goo.gl/9XTRvq>

*Fall '16 - Spring '17*    **Analysis of Sequence Encoders for NLP**    [Master's Thesis](#)

- Re-implemented and modified Skip-Thought and End-to-End Memory Network models to produce more powerful sentence representations for classification and Q&A tasks.
- Experimented with recurrent variational autoencoders in the Skip-Thought framework.
- Analyzed performance on original and auxiliary tasks for insight into embedding procedure.
- Git: <https://github.com/akandykeller/memn2n>
- Git: <https://github.com/akandykeller/skip-thoughts>
- Thesis: <https://escholarship.org/uc/item/0wg0r7hn>

*Spring '16*    **Learning Text Annotations w/ Sequence-to-Sequence Networks**    [Personal](#)

- Trained a sequence to sequence network on (song-lyric, descriptive annotation) pairs scraped from genius.com. Translated ordinary language into song lyrics.
- Git: <https://github.com/akandykeller/GeNet>

# Projects

*Fall '15*    **Empirical Investigation of Deep Network Overfitting**    [Personal Project](#)

- Formulated and implemented a suite of experiments in Theano to determine a quantitative relationship between multi-layered neural network architectures (dimensionality & depth), and their ability/inclination to overfit a given set of data under traditional optimization techniques.
- Git: [https://github.com/akandykeller/Disbelief\\_Nets](https://github.com/akandykeller/Disbelief_Nets)

*Winter '14*    **NxN Cube Snake Puzzle Solver**    [Personal Project](#)

- Developed representation/encoding for 3D snake puzzle of arbitrary size and implemented C++ depth-first search to iterate over billions of possible positions and find all solutions.
- Git: <https://github.com/akandykeller/NxNSolver>

*June '14*    **CUDA / Open GL 3D Surface Spectrogram**    [Caltech – CS 179](#)

- Real-time 3D plot of frequency vs. time for given audio files. Implemented on GPU using CUDA for parallel Fast Fourier Transform & interactive display.
- Git: [https://github.com/akandykeller/3D\\_Spectrogram](https://github.com/akandykeller/3D_Spectrogram)

*Spring '14*    **Netflix Prize**    [Caltech – CS 156b Machine Learning](#)

- Implemented and optimized collaborative filtering algorithms (SVD++, BRISMF) from literature to compete in class re-production of Netflix prize competition.
- Got 2nd place undergraduate team in the competition with RMSE: 0.827

*June '13*    **Efficient Reed Solomon Error Correcting Encoder/Decoder**    [Caltech – CS 127](#)

- C implementation of encoding and decoding of Reed-Solomon codes with efficient bitwise representation of polynomials, resulting in the fastest implementation in the class.
- Git: <https://github.com/akandykeller/Reed-Solomon>

*December '13*    **CloudChaser: SoundCloud Artist Recommendation Tool** [Personal Project](#)

- Analyzes the social activity of SoundCloud artists, including who they follow and whose music they comment on, generating a graph upon which PageRank is applied to suggest up-and-coming musicians your favorite musicians are interested in.
- Git: <https://github.com/akandykeller/cloudchaser>