

# MARUAN AL-SHEDIVAT

(412) 500-1035 ◊ alshedivat [at] cs.cmu.edu ◊ [maruan.alshedivat.com](http://maruan.alshedivat.com)

## INTERESTS

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Sequential decision making, multi-task learning, deep learning, explainable models, graphical models. Applications in healthcare, time series analysis, dialog systems, multi-agent systems, and general AI.

## EDUCATION

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**Carnegie Mellon University, School of Computer Science, USA** Sep 2015 – present

*Ph.D. in Machine Learning (GPA: 4.1 / 4.0)*

Advisor: Eric P. Xing

**King Abdullah University of Science and Technology, KSA** Sep 2013 – Jun 2015

*M.Sc. in Computer Science (GPA: 4.0 / 4.0)*

Thesis: “Brain-inspired Stochastic Models and Implementations.”

**Yandex School of Data Analysis, Russia** Sep 2011 – Jun 2013

*M.Eng. (equiv.) in Data Analysis (GPA: 5.0 / 5.0)*

Industry-level training in machine learning, data analysis, software engineering.

**Lomonosov Moscow State University, Russia** Sep 2009 – Jun 2013

*B.Sc. in Physics, Summa Cum Laude (GPA: 5.0 / 5.0)*

## EXPERIENCE

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**Carnegie Mellon University** Sep 2015 – present

*Graduate Researcher (SAILING lab)*

*Pittsburgh, PA*

- Research mainly revolves around the models of temporal and sequential processes, inference, predictive uncertainty, interpretable decision-making processes. Equally interested in theory and applications.

Advisor: Eric P. Xing.

**OpenAI** May 2017 – Aug 2017

*Member of Technical Staff (Intern)*

*San Francisco, CA*

- Research in meta-learning, deep reinforcement learning, multi-agent systems.

Mentors: Pieter Abbeel, Yuri Burda, Igor Mordatch.

**University of California, San Diego** Jun 2014 – Nov 2014

*Visiting Scholar (Gert Cauwenberghs' lab)*

*San Diego, CA*

- Research was focused on functional implications of synaptic stochasticity in neural networks.

Mentors: Emre Neftci, Gert Cauwenberghs.

**KAUST** Sep 2013 – Jul 2015

*Graduate Researcher (Sensors lab)*

*Thuwal, KSA*

- Research was in machine learning, transfer learning, and computation with stochastic networks.

Advisor: Khaled N. Salama.

**Yandex, School of Data Analysis** Sep 2012 – Jun 2013

*Student/Intern*

*Moscow, Russia*

**MSU, International Laser Center, Automation Labs** Sep 2010 – Aug 2011

*Directed Student, Summer Engineering Intern*

*Moscow, Russia*

## PUBLICATIONS

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### Preprints & Working Papers

- [1] *Contextual Explanation Networks*  
Al-Shedivat, M., Dubey, A., and Xing, E.P.  
In submission (arXiv:1705.10301)  
Press: **NLP Highlights**  
▷ Abstract to be presented at the Interpretable ML and ML for Healthcare workshops, NIPS, 2017
- [2] *Learning Policy Representations in Multiagent Systems*  
Grover, A., Al-Shedivat, M., Gupta, J., Burda, Y., and Edwards, H.  
In submission

### Conference & Journal Articles

- [3] *Continuous Adaptation via Metalearning in Nonstationary and Competitive Environments*  
Al-Shedivat, M., Bansal, T., Burda, Y., Sutskever, I., Mordatch, I., and Abbeel, P.  
*International Conference on Learning Representations (ICLR)*, May, 2018 (**oral**)  
Press: **WIRED, Quartz**
- [4] *Learning with Opponent-Learning Awareness*  
Foerster, J.N.\* , Chen, R.Y.\* , Al-Shedivat, M., Whiteson, S., Abbeel, P., and Mordatch, I.  
*International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, July, 2018
- [5] *Learning Scalable Deep Kernels with Recurrent Structure*  
Al-Shedivat, M., Wilson, A.G., Saatchi, Y., Hu, Z., and Xing, E.P.  
In *Journal of Machine Learning Research (JMLR)*, 18(82):137, 2017  
▷ Abstract presented at the Bayesian Deep Learning workshop, NIPS, 2016
- [6] *HMMs with Nonparametric Emissions via Spectral Decompositions of Continuous Matrices*  
Al-Shedivat, M.\* , Kandasamy, K.\* and Xing, E.P. (\* denotes equal contribution)  
*Advances in Neural Information Processing Systems (NIPS)*, December, 2016
- [7] *ADIOS: Architectures Deep In Output Space*  
Cissé, M., Al-Shedivat, M., and Bengio, S.  
*International Conference on Machine Learning (ICML)*, June, 2016
- [8] *Stochastic Synapses Enable Efficient Brain-Inspired Learning Machines*  
Neftci, E.O., Pedroni, B.U., Joshi, S., Al-Shedivat, M., and Cauwenberghs, G.  
*Frontiers in Neuroscience*, June, 2016
- [9] *Memristors Empower Spiking Neurons with Stochasticity*  
Al-Shedivat, M., Naous, R., Cauwenberghs, G., and Salama, K.N.  
*IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, June, 2015
- [10] *Learning Non-deterministic Representations with Energy-based Ensembles*  
Al-Shedivat, M., Neftci, E., and Cauwenberghs, G.  
*International Conference on Learning Representations (ICLR)*, workshop track, May, 2015
- [11] *Inherently Stochastic Spiking Neurons for Probabilistic Neural Computation*  
Al-Shedivat, M., Naous, R., Neftci, E., Cauwenberghs, G., and Salama, K.N.  
*7th International IEEE EMBS Neural Engineering Conference (NER)*, April, 2015
- [12] *Supervised Transfer Sparse Coding*  
Al-Shedivat, M., Wang, J.J., Alzahrani, M., Huang, J.Z., and Gao, X.  
*AAAI Conference on Artificial Intelligence (AAAI)*, July, 2014

## Conference & Workshop Abstracts

- [13] *The Intriguing Properties of Model Explanations*  
 Al-Shedivat, M., Dubey, A., and Xing, E.P.  
*Interpretable ML Symposium, NIPS*, December, 2017 (**spotlight**)
- [14] *Personalized Survival Prediction with Contextual Explanation Networks*  
 Al-Shedivat, M., Dubey, A., and Xing, E.P.  
*NIPS workshop on Machine Learning for Healthcare (ML4H)*, December, 2017 (**spotlight**)
- [15] *Scalable GP-LSTMs with Semi-Stochastic Gradients*  
 Al-Shedivat, M., Wilson, A.G., Saatchi, Y., Hu, Z., and Xing, E.P.  
*NIPS workshop on Bayesian Deep Learning*, December, 2016
- [16] *Learning Diverse Overcomplete Dictionaries via Determinantal Priors*  
 Al-Shedivat, M., Choe, Y.J., Spencer, N., and Xing, E.P.  
*ICML workshop on Geometry in Machine Learning*, June, 2016
- [17] *Neural generative models with stochastic synapses capture richer representations*  
 Al-Shedivat, M., Neftci, E., and Cauwenberghs, G.  
*Cosyne*, March, 2015
- [18] *Shaping of Femtosecond Laser Pulses with Plasmonic Crystals*  
 Shcherbakov, M.R., Vabishchevich, P., Zubjuk, V.V., Al-Shedivat, M.F., Dolgova, T.V., and Fedyanin, A.  
*Frontiers in Optics*, 2013
- [19] *Modeling the Process of Femtosecond Laser Pulse Shaping*  
 Al-Shedivat, M.  
*XXII International Conference "Lomonosov"*, Book of abstracts, 2274, 2013
- [20] *Polarization State Dynamics of a Femtosecond Laser Pulse at Plasmon Polariton Resonance*  
 Al-Shedivat, M.  
*XX International Conference "Lomonosov"*, Book of abstracts, 1298, 2011

## HONORS & AWARDS

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<b>NIJ Real-Time Crime Forecasting Challenge</b> prize winner	2017
<b>ACM UPE Scholarship</b> for academic excellence and contribution to ACM chapter Awarded annually to only four ACM student members worldwide.	2014
<b>KAUST Dean's Award</b> for outstanding Ph.D. students, Saudi Arabia	declined
<b>KAUST Graduate Fellowship</b> , Saudi Arabia	2013 – 2015
<b>Lomonosov Fellowship</b> for excellence in academics and research, Russia Annual award to only two senior students by Moscow State University.	2013
<b>Arcimovich Fellowship</b> for excellence in academics and research, Russia Annual award to only two senior students by Faculty of Physics.	2012

## TEACHING

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### CMU

- 10-708: Probabilistic Graphical Models. Guest lecturer and TA for Eric P. Xing      Spring 2017
- 10-807: Topics in Deep Learning. TA for Russ Salakhutdinov      Fall 2016

### KAUST

- CS229: Machine learning. TA for Xiangliang Zhang      Spring 2014, Spring 2015

## SERVICES

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**Program Committee:** NIPS (2017), ICML (2018), UAI (2018)

**ACM Student Chapter**

2013 – 2015

*Leader of the KAUST ACM Student Chapter. Co-organizer of the ACM programming tutorials.*

## COMPUTER SKILLS

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**GitHub** <https://github.com/alshedivat>  
**Languages** Python, C/C++, Julia, JavaScript, ...  
**OS** Mac OS, Unix, Windows

## LANGUAGES

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<b>Russian</b>	Native	<b>English</b>	Fluent
<b>Arabic</b>	Basic	<b>French</b>	Elementary