

# MARUAN AL-SHEDIVAT

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## INTERESTS

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Sequential decision making, multi-task learning, deep learning, graphical models, interpretable ML. Applications in healthcare, natural language, 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  
Advisor: Eric P. Xing.

**Google Research** May 2018 – Dec 2018  
*Research Intern / Student Researcher*  
New York, NY

- Research in language generation in low-resource and multitask/multilingual settings.

Mentor: Ankur Parikh.

**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

## HONORS & AWARDS

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<b>Best Paper Award, ICLR</b>	2018
<b>CMLH Fellowship in Digital Health</b>	2018-2019
<b>NIJ Real-Time Crime Forecasting Challenge</b> prize winner (\$55,000 team prize)	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 (\$70,000 annual funding)	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

## PUBLICATIONS

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### Preprints & Working Papers

- [1] *Contextual Explanation Networks*  
 Al-Shedivat, M., Dubey, A., and Xing, E.P.  
 Preprint (arXiv:1705.10301), Press: [NLP Highlights](#)  
 ▷ *The work was spotlighted at the Interpretable ML and ML for Healthcare workshops, NIPS, 2017*

### Conference & Journal Articles

- [2] *DiCE: The Infinitely Differentiable Monte-Carlo Estimator*  
 Foerster, J.N., Farquhar, G.\*, Al-Shedivat, M.\*, Rocktschel, T., Xing, E.P., Whiteson, S.  
*International Conference on Machine Learning (ICML)*, July, 2018 (**full oral**)
- [3] *Learning Policy Representations in Multiagent Systems*  
 Grover, A., Al-Shedivat, M., Gupta, J., Burda, Y., and Edwards, H.  
*International Conference on Machine Learning (ICML)*, July, 2018 (**full oral**)
- [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] *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, (**Best Paper Award**)  
 Press: [WIRED](#), [Quartz](#)
- [6] *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*
- [7] *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
- [8] *ADIOS: Architectures Deep In Output Space*  
 Cissé, M., Al-Shedivat, M., and Bengio, S.  
*International Conference on Machine Learning (ICML)*, June, 2016

- [9] *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 (**full oral**)
- [10] *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
- [11] *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
- [12] *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
- [13] *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

- [14] *Evaluating Generalization in Multiagent Systems using Agent-Interaction Graphs*  
Grover, A., Al-Shedivat, M., Gupta, J., Burda, Y., and Edwards, H.  
*International Conference on Autonomous Agents and Multiagent Systems*, July, 2018
- [15] *The Intriguing Properties of Model Explanations*  
Al-Shedivat, M., Dubey, A., and Xing, E.P.  
*Interpretable ML Symposium, NIPS*, December, 2017 (**spotlight**)
- [16] *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**)
- [17] *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
- [18] *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
- [19] *Neural generative models with stochastic synapses capture richer representations*  
Al-Shedivat, M., Neftci, E., and Cauwenberghs, G.  
*Cosyne*, March, 2015
- [20] *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
- [21] *Modeling the Process of Femtosecond Laser Pulse Shaping*  
Al-Shedivat, M. *XXII International Conference "Lomonosov"*, Book of abstracts, 2274, 2013
- [22] *Polarization State Dynamics of a Femtosecond Laser Pulse at Plasmon Polariton Resonance*  
Al-Shedivat, M. *XX International Conference "Lomonosov"*, Book of abstracts, 1298, 2011

## 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 Ruslan Salakhutdinov      Fall 2016

### KAUST

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

## LEADERSHIP & SERVICES

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### Program Committee and/or Reviewer

- **Journals:** JMLR (2018), Neural Networks (2018)
- **Conferences:** NIPS (2017, 2018), ICML (2018, 2019), UAI (2018), ICLR (2019)
- **Workshops:**
  - Learning with Limited Labeled Data, NIPS (2017)
  - Theoretical Foundations and Applications of Deep Generative Models, ICML (2018)
  - Deep Reinforcement Learning Workshop, NIPS (2018)
  - Relational Representation Learning Workshop, NIPS (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

## REFERENCES

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*Available upon request.*