# Sarkhan Badirli

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## Research Interests & Skills

Statistical Machine Learning, NLP, Computer Vision

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| Languages: | Python, MATLAB, C++ |
| Apps & Tools: | Scikit-learn ML library, Pytorch, Bloomberg, LaTeX |
| Algorithms: | Bayesian Inference, Zero-Shot Learning, Generative Adversarial Nets |

## Education

Aug 2016 – 2021 (expected) **Purdue University, West Lafayette, IN, USA**
Ph.D. in Computer Science, Specialization: Machine Learning
• GPA 3.93/4.00

Nov 2014 **Swiss Federal Institute of Technology (ETH), Zurich, Switzerland**
M.S. in Applied Mathematics, Concentration: Quantitative Finance
•GPA 4.86/6.00
• Azerbaijan state full scholarship (annual $18,000 + tuition)

Jun 2012 **Middle East Technical University (METU), Ankara, Turkey**
B.S. in Mathematics
• Graduated 1 year sooner than expected (top 5%); GPA: 3.55/4.00
• Azerbaijan state full scholarship (annual $9,000 + tuition)

## Work Experience

May – Aug, 2019 Research Scientist Intern, Criteo AI Lab, Palo Alto
• Developed off-shelf Neural Network algorithm for traditional ML tasks in Pytorch: combined gradient boosting with NN
• Achieved results in classification, regression and learning to rank tasks that were superior to GBDT that live in production
• Expecting publication at ML conference

Mar – Jul, 2016 Quantitative Risk Analyst, State Oil Fund of Azerbaijan, Baku
• Analyzed performance metrics of all SOFAZ portfolios
• Constructed intuitive user-friendly dashboards for presentation of results to senior management

## Projects

Zero-shot learning: Image classification in generalized ZSL setting
- Hierarchical Bayesian generative model, code in MATLAB

Hyperspectral Image Processing: Finding rare minerals on the surface of Mars
- Bayesian Inference, Unsupervised learning, MCMC sampling, DP Mixture Models
- Prototype in MATLAB, code in C++

Authorship Attribution: Identifying Victorian Era novels in open-set classification setup
- Supervised learning, authorship attribution, data augmentation
- NLP tools in Python: NLTK, Spacy

## Awards and Certificates

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| Dec 2017 | **National Winner (USA) & Global 2nd place** in Roche Code4Life University Challenge 2017 (as a team of 3), San Francisco |
| Nov 2016 | **Best Designed Hack** in HackOHI/O (Winner of Amazon Web Services challenge as a team), Ohio State University |
| 2009–2012 | **High Honors** student, METU |
| Jul 2008 | **Bronze Medal** in 49th International Mathematical Olympiad (IMO), Madrid, Spain |
| Jan 2008 | **Silver Medal** in International Zhautykov Olympiad in Mathematics, Almaty, Kazakhstan |
| Apr 2008 | **Silver Medal** (2nd nationwide) in National Mathematical Olympiad, Baku, Azerbaijan |
| Mar 2008 | **Participation Certificate** in 25th Balkan Mathematical Olympiad, Ohrid, Macedonia |
| Jul 2007 | **Participation Certificate** in 48th IMO, Hanoi, Vietnam |

## Related Experience

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| Aug 2016–Present | Teaching/Graduate assistant, Purdue University, Indianapolis<br>CS 481 Data Mining (Undergrad), CS 578 Statistical Machine Learning (Grad) |
| Summer 2018 | Mentor in NSF REU program, Purdue University, Indianapolis<br>Mentored 2 undergrad students from Maryland and Colorado universities and led to publication at the end of program |
| Jun–Jul 2008 | Junior coach, Azerbaijan Mathematics Olympiad Team Training Camp, Baku<br>Taught advanced topics in Number Theory and Algebra. Assisted in training and selecting 6 Azerbaijan team members to compete at the 2009 IMO |

## Languages

Azerbaijani (native), English (fluent), Turkish (bilingual proficiency), Russian (beginner)

## Activities and Interests

Oct 2014 *Geneva Peace Conference* (volunteer staff), United Nations, Switzerland
- Start-ups, Wild camping, Travelling, Playing Football, Tennis and Chess

## Publications

**S. Badirli**, M. Dundar, and Z. Akata. *Submitted* (2019). Bayesian zero-shot learning.

**S. Badirli**, M. B. Ton, A. Gungor, and M. Dundar. *Submitted* (2019). Open Set Authorship Attribution toward Demystifying Victorian Periodicals.

K. Gray, D. Smolyak, **S. Badirli**, and G. Mohler (2019). Coupled IGMM-GANs for improved generative adversarial anomaly detection. In *5th National Symposium for NSF REU Research in Data Science* (at 2018 IEEE International Conference on Big Data).