# Xi He

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## Education

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| Aug 14' - Present | **Ph.D. Candidate in Lehigh University, Bethlehem, PA, USA**<br>Major.....: Industrial and System Engineering<br>Current advisor: Prof. Martin Takáč |
| Aug 12' - May 14' | **Master of Science in Nankai University, Tianjin, China**<br>Major.....: Computational Mathematics |
| Sep 08' - Jun 12' | **Bachelor of Science in Nankai University, Tianjin, China**<br>Major.....: Mathematics |

## Working Experience

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| **Participant** | *Intel Corporation, Santa Clara, CA, USA* |
| Aug 15' - Present | **Large-scale Distributed Optimization in Deep Neural Networks**<br>▶ Implemented various of standard approached to training deep learning model.<br>▶ Applied distributed high performance computing technique to accelerate training rate. |
| **Research Assistant** | *Department of Industrial and Systems Engineering, Lehigh University* |
| Nov 15 - Feb 16' | **Dual Free Mini-batch SDCA with adaptive probabilities**<br>▶ Derived optimal probability distribution for dual free SDCA by exploring sub-optimality.<br>▶ Developed unbiased non-uniform mini-batch sampling techniques to improve performance.<br>▶ Guaranteed better complexity bound and convergence rate for the adaptive algorithm. |
| **Internship** | *Predictive Anytics and Monitoring, Siemens Corporation, Princeton, NJ, USA* |
| June 15' - Sep 15' | **Deep Learning via Hessian-Free Approach**<br>▶ Proposed new algorithm which made use of its approximated local Hessian Matrix information.<br>▶ Guaranteed to reach local optimality instead of sticking at critical point.<br>**Estimating Large-Loss Probability in Credit Portfolio Risk**<br>▶ Derived optimal risk loading coefficients by fully using dependency information among obligors.<br>▶ Estimated large-loss probability of a portfolio by normal copula model and important sampling. |
| **Research Assistant** | *Department of Industrial and Systems Engineering, Lehigh University* |
| Sep 14' - May 15' | **Asynchronous CoCoA**<br>▶ Proposed asynchronous distributed algorithms for empirical minimization problem.<br>▶ Analyzed communication efficient protocol to achieve better speed-up. |
| **Teaching Assistant** | *Department of Industrial and Systems Engineering, Lehigh University* |
| Sep 14' - May 15' | **Applied Engineering Statistics** |

## Publications

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| Conference | **[1] Dual Free Adaptive Mini-Batch SDCA for Empirical Risk Minimization**, with Martin Takáč. Under Reviewed by ICML 2016.<br>**[2] Dual Free SDCA for Empirical Risk Minimization with Adaptive Probabilities**, with Martin Takáč. Accepted by NIPS 2015.<br>**[3] Estimating Portfolio Loss Probabilities with Optimal Risk Loading Coefficients and Fixed Dependency among Obligors,** with Amit Chakraborty, Ioannis Akrotirianakis. |

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| | [4] **Exploiting negative curvature in deep learning optimization problems,** with Ioannis Akrotirianakis, Amit Chakraborty. |
| | [5] **Asynchronous Distributed Stochastic dual (Block) Coordinate Descent Methods,** with Martin Takáč. |
| | [6] **Coordinate Descent Methods for Linearly Constrained Optimization,** with Martin Takáč. |
| Journal | [7] **A Method with Parameter for Solving the Spectral Radius of Non-negative Tensor,** with Yiyong Li, Qingzhi Yang. Under Review. |

## Computing Skills

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| Programming | C++ (MPI, OpenMP), Matlab, R, Python (Spark), Mathematica |
| Optimization | AMPL, CPLEX, MOSEK, Gurobi |
| Others | Shell Script, LaTeX, Mac OS, Linus, Windows |

## Selected courses and Projects

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| Spring 16' | **Optimization in Machine Learning,** Lehigh University. |
| Fall 15' | **Massive Data Mining,** Lehigh University. |
| | ▶ ***Question & Answer System:*** Designed competitive Q&A system to attain up to 39.5% accuracy by detecting Apache Lucene and Natural Language Toolkit, etc.. |
| Fall 15' | **Computational Method,** Lehigh University. |
| | ▶ ***Compressed Sensing:*** Used of $\ell_1$-regularized lasso model to recovery pictures with missing pixels. Multiple algorithms (ISTA, FISTA, GRPS) are implemented in C++ and compared. |
| Spring 15' | **Pattern Recognition,** Lehigh University. |
| | ▶ ***Digit Recognizer:*** Implemented a Matlab software package to compare various of classifiers (Support Vector Machine, Artificial Neural Network, Decision Tree, KKN) for character-image classification problem. |
| Fall 14' | **Integer Programming,** Lehigh University. |
| | ▶ ***Mixed binary problem solver:*** Implemented a Python software package to address mixed binary programming problem with branch and cut method. |
| Spring 14' | **Machine Learning,** Andrew Ng (Stanford University), Coursera. |
| In progress | **High Performance Scientific Computing,** Randall J. LeVeque, Coursera. |
| | **Machine Learning,** Andrew Ng, Coursera. |

## Presentation

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| Nov 15' | **Dual Free SDCA for Empirical Risk Minimization with Adaptive Probabilities,** NIPS 2015, Montréal, Canada. |
| Aug 13' | **Estimating Portfolio Loss Probabilities with Optimal Risk Loading Coefficients and Fixed Dependency among Obligors,** Siemens Corporation, Corporate Technology, Princeton, US. |
| Nov 14' | **Random Coordinate Descent Method on Large-scale Optimization Problems,** Coral Seminar, Lehigh University. |

## Honors and Grants

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| Jan 16' - May 16' | Dean's Doctoral Fellowship, Lehigh University. |
| Sep 15' - Jan 16' | Dean's Doctoral Fellowship, Lehigh University. |

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| Sep 14' - Sep 15' | Dean's Doctoral Assistantship, Lehigh University. |
| Sep 13' - Jun 14' | First Prize of Excellent Master Scholarship, Nankai University. |
| Sep 12' - Jun 14' | Fellowship Award, Nankai University. |

## Reference

Martin Takáč, Department of Industrial and Systems Engineering, H.S. Mohler Laboratory, Lehigh University, Bethlehem, PA 18015, takac@lehigh.edu.