# Bin Deng

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## EDUCATION

**2014 – present: Master Student in Machine Learning**

Machine Learning Department, School of Computer Science, Carnegie Mellon University, Pittsburgh, Pennsylvania

**2011- 2014 Research Fellow**

Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts

**2011 Ph.D. in Rehabilitation Science**

University of Kansas Medical Center, Kansas City, Kansas

**2006 B.S. in Biological Science**

Tsinghua University, Beijing, China

## CORE COURSES

**Graduate**

**Carnegie Mellon University, 2014 fall**

- **Machine Learning**

  Naïve Bayes, logistic regression, linear regression, Gaussian process, bias/variance tradeoff, perceptron, margin and kernel perceptrons, kernels, support vector machines, gradient descent, optimization, density estimation, k-NN, kernel regression, decision trees, boosting, graphical models, variable elimination, Bayes nets, independence, d-separation, Markov random fields, factor graphs, belief propagation, junction tree, hidden Markov models, plate notation, learning theory, clustering, EM algorithm, PCA and deep learning

  **Project: application of collaborative filtering algorithms in large-scale educational data mining**

  Based on students' previous performance, we applied collaborative filtering (singular value decomposition), an algorithm widely used in recommendation system, to learn latent features of each student and question. Unknown outcomes of question answering can be predicted and appropriate questions can be recommended to students for better improvement. Procedures included data process, modeling with collaborative filtering, stochastic gradient descent, cross validation, parameter tuning and prediction.

- **Intermediate Statistics**

  Inequalities, VC theory, convergence, sufficiency, likelihood, point estimation, minimax theory, asymptotics, testing, confidence intervals, nonparametric, bootstrap, Bayesian inference, prediction, model selection and causation

**Carnegie Mellon University, 2015 spring**

- Statistical Machine Learning
- Machine Learning with Large Datasets
- Convex Optimization

- Probabilistic Graphical Models

**University of Kansas Medical Center**

- **Applied Linear Regression**
  Simple and multiple linear regression models, residue diagnostics, lack of fit, Box-Cox transformation, quantitative and qualitative predictors, model diagnostics and remedial measures
  **Project: developing a linear model to analyze impacts of five predictor variables (economic ability index, urban population percentage, population change, percent of population aged 5-19 years, percent of population over 65 years) on local public expenditures**
  Scatter and correlation matrices; stepwise, backward and forward selections of predictor variables; assumption checking; analysis of multicolinearity: variance inflation factors (VIFs); data centering; reduced model and full model; interaction effect on response variable; evaluation of potential outliers
- **Analysis of Variance**
  Plotting procedures, power analysis, randomization, p-value, confidence intervals, assumptions, one-way, two-way and multiple ANOVA, post hoc analyses, goodness of fit, repeated measure analysis and analysis of covariance
  **Project: analyzing effects of voluntary exercise and gender difference on mouse mechanical allodynia**
  Sample size determination by power analysis; randomization; boxplots, histograms and mean plots; Q-Q plots; Hartley's test and Levene's test; data transformation; test for higher order interactions; one-way and two-way ANOVA; contrasts
- **Fundamentals of Biostatistics**
  Discrete and continuous random variables, Bayes's theorem, conditional probability, Normal, Binomial, t, Bernoulli and Poisson distributions, central limit theorem, probability density functions, parameter estimates, confidence intervals and hypothesis tests
- **Introduction to Clinical Research**
  Clinical research design, protocol, biostatistical considerations, recruitments of study participants, regulatory issues, data management and defining measures and instruments

**Undergraduate**

**Tsinghua University**

- Calculus I
- Calculus II
- Multivariate Calculus
- Linear Algebra and Analytic Geometry
- Fundamentals of Computer Software Technique

**PUBLICATIONS**

1. **Deng, B.**, Parthasarathy, S., Wang, W.F., Gibney, B.R., Battaile, K.P., Lovell, S., Benson, D.R., and Zhu, H. (2010) "Study of the Individual Cytochrome b5 and Cytochrome b5 Reductase Domains of Ncb5or Reveals a Unique Heme Pocket and a Possible Role of the CS Domain". *J.Biol.Chem*. (U.S.A.), 285:30181-30191.
2. Guo, Y., Xu, M., **Deng, B.**, Frontera, J.R., Kover, K.L., Aires, D., Ding, H., Carlson, S.E., Turk, J., Wang, W., and Zhu, H. (2012) "Beta-Cell Injury in Ncb5or-null Mice is Exacerbated by Consumption of a High-Fat Diet". *Eur. J. Lipid Sci. Technol.*, 114(3): 233-243
3. Dalli, J., Zhu, M., Vlasenko, N.A., **Deng, B.**, Haeggstrom, J.Z., Petasis, N.A., and Serhan, C.N. (2013) "The Novel 13S,14S-epoxy-maresin is Converted by Human Macrophages to Maresin 1 (MaR1), Inhibits Leukotriene A4 Hydrolase (LTA4H), and Shifts Macrophage Phenotype". *FASEB J.*, 27(7): 2573-2583 (**cover story**)
4. **Deng, B.**, Wang, C.W., Arnardottir, H.H., Li, Y., Cheng, C.Y., Dalli, J., and Serhan, C.N. (2014) "Maresin Biosynthesis and Identification of Maresin 2, a New Anti-inflammatory and Pro-resolving Mediator from Human Macrophages". PLoS One, 9(7): e102362
5. **Deng, B.**, Sturms, R., Douglas, J., Parthasarathy, S., Wang, W.F., Fenton, A., Hargrove, M., Benson, D.R., and Zhu, H. "The Intrinsically Disordered N-terminal Region of Ncb5or, a Redox Enzyme Implicated in Diabetes". *In revision*.

**AWARDS AND HONORS**

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| **2006-2011** | Straight "A" in 23/24 of graduate courses at University of Kansas Medical Center; GPA 3.98/4 |
| **2011** | The American Society for Biochemistry and Molecular Biology (ASBMB) Graduate Student Travel Award |
| **2010** | Student Union Corporation Travel Award, University of Kansas Medical Center |
| **2002** | Total score ranked 17 in 100,000 students from Yunnan Province in National College Entrance Examination (China) |
| **2002** | Bronze medal in National Chemistry Competition (China) |

**SOFTWARES AND SKILLS**

- MATLAB
- R
- SAS
- Office
- SPSS
- Java
- C

**NOTE**

No visa sponsoring is required