# Youguang Chen

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## Education

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|---|---|
| 2019 – *Present* | Ph.D. student in Computational Science, Engineering & Mathematics<br>*The University of Texas at Austin*<br>Gpa: 4.00/4.00 |
| 2016 – 2019 | M.S. in Petroleum Engineering<br>*The University of Texas at Austin*<br>Gpa: 4.00/4.00 |
| 2012 – 2016 | B. Eng. in Environmental Engineering<br>*Tsinghua University*<br>Gpa: 91.6/100.0 |

## Research Interest

Active Learning, Online Learning, Statistical Learning, Optimization, Generative Modeling.

## Publications

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| 2023 | *FIRAL: An Active Learning Algorithm for Multinomial Logistic Regression.*<br>Thirty-seventh Conference on Neural Information Processing Systems (2023).<br>**Youguang Chen**, George Biros |
| 2020 | *KNN-DBSCAN: a DBSCAN in high dimensions.*<br>arXiv preprint arXiv:2009.04552 (2020).<br>**Youguang Chen**, William Ruys, George Biros |
| 2020 | *An efficient method for modeling flow in porous media with immersed faults.*<br>arXiv preprint arXiv:2009.04574 (2020).<br>**Youguang Chen**, George Biros |
| 2015 | *Removal of perfluorinated carboxylates from washing wastewater of perfluorooctanesulfonyl fluoride using activated carbons and resins.*<br>Journal of hazardous materials 286 (2015): 136-143.<br>Ziwen Du, Shubo Deng, **Youguang Chen**, Bin Wang, Jun Huang, Gang Yu |

## Honors and Awards

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| Sep. 2019 | NIMS Fellowship in Oden Institute, UT Austin |
| Aug. 2018 | S.P. Yates Graduate Fellowship, UT Austin |
| Aug. 2017 | S.P. Yates Graduate Fellowship, UT Austin |
| Aug. 2015 | Tsinghua University Academic Excellence Scholarship (10/81) |
| Aug. 2014 | Tsinghua University Independent Research Assistantship (5/81) |

## Research Experience

2020-2021 | **Oden Institute, UT Austin**
Topic: Active learning for multinomial logistic regression
*Proved that the Fisher Information Ratio (FIR) is a lower and upper bound of the excess risk for multinomial logistic regression under sub-Gaussian assumptions in batch-active learning setting.*
*Proposed a new active learning algorithm FIRAL to optimize FIR via regret minimization method and derived performance guarantee of the proposed algorithm.*
*Empirically compared FIRAL with other methods and found that it outperforms them.*

2020-2021 | **Oden Institute, UT Austin**
Topic: Representative subset selection
*Solved the optimal-design problem using regret-minimization with negentropy regularizer and proved the near-optimality of the new algorithm.*
*Empirically compared different methods for selecting representative samples on real-world classification datasets.*

2019-2020 | **Oden Institute, UT Austin**
Topic: Parallel algorithms for clustering
*Proposed new algorithm to use $k$-nearest neighbor graph for density-based clustering.*
*Designed, implemented, and tested a hybrid MPI/OpenMP parallel algorithm.*
*Performed tests to assess the clustering quality and the scalability of the new scheme.*

2018-2019 | **Oden Institute, UT Austin**
Topic: Fluid simulation in porous media with immersed faults
*Derived new PDEs as approximations and conducted convergence analysis.*
*Implemented the new formulations using Galerkin methods.*
*Tested preconditioned iterative Krylov solves of the new method.*

## Software

Parallel $k$NN-DBSCAN | A MPI/OpenMP parallel algorithm for $k$NN-based density clustering.
https://github.com/ut-padas/knndbscan

## Skills

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| Programming Languages | C++, C, Python, Matlab, Fortran |
| Tools | TensorFlow, OpenMP, MPI, cmake, git, LaTeX, Gmsh, FEniCS |
| Operating Systems | Linux, MacOS, Windows |

## Relevant Graduate Level Courses

Methods of Applied Mathematics
Functional Analysis
Differential Equations
Parallel Algorithms in Scientific Computing
Mathematical Modeling in Science and Engineering
Probabilistic learning and inference
Linear Algebra
Convex Optimization
Probability and Stochastic Processes
Online Learning
Randomized Algorithms
Statistical Learning