AKSHAY AJAGEKAR

Systems Engineering, Cornell University

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EDUCATION

Cornell University   *January 2020 - Present*

- PhD in Systems Engineering
- Advisor: Dr. Fengqi You
- Project areas: Quantum computing, Optimization, Deep learning, Reinforcement learning

Cornell University   *August 2018 - January 2020*

- Master of Science (MS) in Chemical Engineering: **GPA - 3.93/4.00**
- Advisor: Dr. Fengqi You
- Thesis: Quantum computing for process systems optimization and data analytics

Indian Institute of Technology (IIT), Patna   *July 2014 - May 2018*

- Bachelor of Technology (B.Tech) in Chemical Science and Technology
- Cumulative **GPA - 9.24/10** with Department rank 1
- Advisor: Dr. Ranganathan Subramanian
- Thesis: Studying the rotational transitions of gas-phase species using a chirped pulse fourier transform microwave spectrometer

PUBLICATIONS

Ajagekar, A., You, F.* (2019). Quantum computing for energy systems optimization: Challenges and opportunities. Energy, 179, 76-89.

Ajagekar, A., Humble, T., You, F.* (2020). Quantum Computing based Hybrid Solution Strategies for Large-scale Discrete-Continuous Optimization Problems. Computers & Chemical Engineering, 132, 106630.

Ajagekar, A., You, F.* (2020). Quantum Computing Assisted Deep Learning for Fault Detection and Diagnosis in Industrial Process Systems. Computers & Chemical Engineering, 132, 106630.

Hamoud, K.A., **Ajagekar, A.**, You, F.* (2020). Harnessing Quantum Computing for Efficient Solution of Large-Scale Scheduling Problems. Submitted to: IEEE Transactions on Systems, Man, and Cybernetics.

Ajagekar, A., You, F.* (2020). Quantum Computing based Hybrid Deep Learning for Fault Diagnosis in Electrical Power Systems. Submitted to: IEEE Transactions on Power Systems.

PATENTS

U.S. Provisional Patent Application Serial No. 62/913,146

- Fengqi You and **Akshay Ajagekar**. Quantum Computing based Hybrid Solution Strategies for Large-scale Discrete-Continuous Optimization Problems.

SELECTED PRESENTATIONS

AIChE Annual Meeting 2019
Orlando, USA
Title: Quantum computing based hybrid quantum-classical solution strategies for large-scale optimization problems.

IEEE International Conference On Systems, Man, and Cybernetics 2020
Toronto, Canada
Title: A deep learning approach for fault detection and diagnosis of industrial processes using quantum computing.

MAJOR RESEARCH EXPERIENCE

Quantum computing for Large-scale Optimization and Machine Learning *Aug '18 - Current*
Cornell University

- The project aims at developing solution strategies that exploit quantum mechanical properties for optimizing large-scale optimization problems. Complementary strengths of both quantum and classical computers are effectively leveraged to overcome the combinatorial complexity. The non-idealities of a quantum computer can also be used to train deep belief networks that are utilized for fault classification.

Studying Rotational Transitions using a Microwave Spectrometer *July '17 - May '18*
IIT Patna

- A chirped pulsed fourier transform microwave spectrometer was designed to study the rotational transitions of a gas-phase species. The constructed 480 MHz bandwidth spectrometer spanned over 11 GHz in the microwave region. From rotational spectra obtained, rotational constants were determined which provided further support for interpretation of bond length, bond angle and dipole moment of the compound under test.

Complexation of Polyelectrolytes with Hydrophobic Drug Molecules *May '17 - July '17*
Nanyang Technological University (NTU), Singapore

- In this work, the phase behaviour of the system was studied by Mean Field theory and molecular dynamic simulations. We found that complexation is a first order like transition and is dependent on factors like valence ratio between monomer and drug molecule, hydrophobicity of the drug and the flexibility of the polyelectrolyte chain.

TEACHING

Graduate Teaching Assistant *Spring 2020*
SysEn 5880 - Big Data Analytics and Machine Learning
Responsibilities: Delivered few lectures for a class of graduate students, Held weekly office hours, Graded homeworks.

Graduate Teaching Assistant *Fall 2019*
CEE 3040 - Uncertainty Analysis
Responsibilities: Delivered weekly 2 hours lectures for sections of 50 junior and senior level undergraduates, Held weekly office hours, Graded course exams.

Graduate Teaching Assistant *Summer 2019, Summer 2020*
SysEn 5888 - Deep Learning
Responsibilities: Delivered few lectures for a class of graduate students, Held weekly office hours.

Graduate Teaching Assistant *Spring 2019*
CEE 5970 - Risk Analysis
Responsibilities: Held weekly office hours, Graded assignments and course exams.

Laboratory Assistant *Fall 2018*
AEP 2640 - Interfacing the Digital Domain with an Analog World
Responsibilities: Guided students through the laboratory experiments and simulations in LabView, Graded lab notebooks.