

Yixuan Sun

CONTACT INFORMATION

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RESEARCH INTERESTS

Mathematical Modeling, Mathematical Optimization, Machine Learning, Fluid Dynamics.

EDUCATION

- **New Jersey Institute of Technology (NJIT)**
 - Ph.D. candidate, Mathematical Sciences (January 2015-present, **GPA 3.964**, expected graduation: December 2020).
 - * Dissertation Topic: Modeling and Design Optimization for Membrane Filtration.
 - * Advisor: **Prof. Linda J. Cummings**.
 - * Co-Advisor: **Prof. Lou Kondic**.
- **University of Maryland (UMD), College Park**
 - B.S. in Nutrition and Food Science (September 2008-May 2010, **GPA 3.615**).
- **China Agricultural University (CAU), Beijing, China**
 - B.S. in B.S. in Chemical Engineering (September 2005- August 2008, **GPA 3.52**).

SKILLS

- **Computation:** Matlab, Python, R, C++.
- **Language:** Chinese, English, basic French and Spanish.
- **Software:** Mathematica, LaTeX, Microsoft Office, Lotus Notes, Chemdraw, Xfig, AlphaSoft.
- **Technical:** HPLC, GC-MS, FT-IR, Alpha MOS and CTC instruments, NMR, DSC.

RESEARCH EXPERIENCE

- **NJIT Department of Mathematical Sciences, Newark, NJ**
 - **Research Assistant**, (September 2016-present).
 - * Model filtration with pleated membrane filter, considering fluid flow in pleated geometry, detailed pore structure, and particle fouling.
 - * Perform asymptotic analysis to simplify the model, and numerically solve the model equations.
 - * Formulate the general optimization problem and solve the optimization problem using Matlab optimization toolbox.
 - * Present the result at conferences and draft the paper for publication (in preparation).
 - * Cast the optimization problem as an optimal control problem and write algorithm in Python to solve the optimal control problem (on going).
- **FDA-CFSAN, College Park, MD**
 - **JIFSAN Intern**, (June 2009-May 2010).
 - * Develop methods for testing Bisphenol-A(BPA) for can food and plastic packaging materials using FT-IR (Fourier Transform Infrared Spectrometry).
 - * Formulate the Procedure for heat press, DSC, FT-IR main bench and Altus Microscope using Excel.
 - * Build infrared spectrum library for various food packaging materials.
- **Food Additive Lab, CAU, Beijing, China**

- **Research Assistant**, (Spring 2008).
 - * Design experiments comparing antioxidant capacity of water and ethanol abstracts of black plum under different pressures and temperatures.
 - * Utilize DPPH radical scavenging, TBARS assay, Superoxide anion scavenging, and Hydrogen peroxide scavenging methods to test the antioxidant capacity of black plum abstracts.
 - * Write study report on the experimental results and put forward a series of related problems for further study.

WORKING
EXPERIENCE

- **Alpha MOS America, Hanover, MD**
 - **Technical Support Engineer**, (October 2010-May 2015).
 - * Design experiment and conduct feasibility study.
 - * Process data using multivariate statistics and machine learning algorithm.
 - * Write and present feasibility study reports to customers.
 - * Install, troubleshoot, and repair Alpha MOS instruments (hardware and software).
 - * Train customers and new colleagues for the experiment design and data processing.

LEADERSHIP
EXPERIENCE

- **NJIT Math Club-SIAM Student Chapter, Newark, NJ**
 - **Treasurer**, (September 2017-present).
 - * Budget for club events.
 - * Maintain club's spreadsheet.
- **BullzEye Inc., Dingman Center for Entrepreneurship, College Park, MD**
 - **Founder and CEO**, (August 2009-February 2010).
 - * Conduct market research and analyze the feasibility of the business plan.
 - * Meet with developer regularly to talk about the progress.
 - * Write and present the business plan at Pitch Dingman Competition and win the third prize.
- **Food Science Club, University of Maryland, College Park, MD**
 - **Vice President**, (March 2009-May 2010).
 - * Coordinate alumni panels and networking events.
- **Lvmai Club (for environmental protection), CAU, Beijing, China**
 - **President**, (Fall 2007-Fall 2008).
 - * Initiate the text book reuse program in China Agricultural University.

TEACHING
EXPERIENCE

- **NJIT Mathematical Sciences Department, Newark, NJ**
 - **Teaching Assistant/Teaching Reserve**, (January 2016-present).
 - * Lead recitation for Calculus I, II.
 - * Cover lectures for professors in short notice, courses including: Calculus I,II, Advanced Engineering Mathematics, ODEs, Linear Algebra, Complex Analysis.
 - * Grade homework and exam and provide feedback.
 - * Proctor exam and hold office hours.
- **University of Maryland, College Park, MD**
 - **Athlete Tutor**, (June 2009-May 2010).

- * Explain science concept and mechanism of nutrition for student athletes.
- * Encourage student athletes to achieve their academic success.
- * Offer suggestions for time management.

- **HongXing School, Beijing, China**

- **Volunteer Teacher**, (Fall 2006-Fall 2007).

- * Teach Junior high school students for math, English, and science.
- * Help the full-time teacher preparing the courses and schedule the courses.
- * Introduce environmental protection practice to the students.

ARTICLES IN
PREPARATION

- *Modeling and design optimization for pleated membrane filters*,
Y.X. Sun, P. Sanaei, L. Kondic, L.J. Cummings (Preprint).

ABSTRACTS AND
POSTERS

- *Investigating the Performance of Pleated Membrane Filters*,
Frontiers in Applied and Computational Mathematics (**FACM**), poster presentation, NJIT,
June **2017**.

TECHNICAL
REPORTS

- *On Characterizing and Simulating Porous Media*,
The Mathematical Problems in the Industry workshop (**MPI**), NJIT, June **2017**.

CONFERENCE
TALKS

- *Modeling and design optimization for pleated membrane filters*,
71st Annual Meeting of the American Physical Society's Division of Fluid Dynamics (**DFD**),
Georgia World Congress Center, Atlanta, GA, November **2018**.
- *Optimizing the design of pleated membrane filters*,
The 9th Northeast Complex Fluids and Soft Matter Workshop (**NCS9**), University of Penn-
sylvania, May **2018**.
- *Optimizing the design of pleated membrane filters*,
Applied Math Days (**AMD**), Rensselaer Polytechnic Institute (RPI), April **2018**.
- *Modeling of pleated membrane filters with detailed pore structure*,
The 8th Northeast Complex Fluids and Soft Matter Workshop (**NCS8**), Columbia University,
January **2018**.

WORKSHOPS &
CONFERENCE

- *FACM* (NJIT, August 2018).
- *FACM* (NJIT, June 2017).
- *MPI* (NJIT, June 2017).
- *Graduate Student Mathematical Modeling Camp (GSMMC)* (RPI, June 2017).

HONORS AND
AWARDS

- 2018 NJIT GSA Conference Travel Award
- 2017 MPI Workshop Travel Award
- 2009 Winner of Pitch Dingman Competition (for entrepreneur), UMD
- 2006 Dupont Scholarship, CAU

PROFESSIONAL
AFFILIATIONS

- American Physical Society (APS).
- Society for Industrial and Applied Mathematics (SIAM).

GRADUATE
COURSEWORK

- Numerical Methods I, II
- Complex Variables I, II
- Advanced Applied Math-Modeling
- Advanced Applied Math I, II, III
- Asymptotic Methods I
- Mathematical Fluid Dynamics I
- Special Topics in Wave
- Probability Theory
- Real Analysis I, II
- Complex Analysis I, II
- Advanced ODEs (Dynamical Systems)

EXTRACURRICULAR
ACTIVITIES

- Reading novels.
- Play chess and soccer.
- Learn violin

REFERENCES

- **Linda J. Cummings**, Professor of Mathematical Sciences, New Jersey Institute of Technology, (973)-596-5479, linda.cummings@njit.edu.
- **Lou Kondic**, Professor of Mathematical Sciences, New Jersey Institute of Technology, (973)-596-2996, lou.kondic@njit.edu.
- **Ian Griffiths**, Research Fellow of Mathematical Institute, University of Oxford, +44 1865 615139, Ian.Griffiths@maths.ox.ac.uk.
- **David G. Shirokoff**, Assistant Professor of Mathematical Sciences, New Jersey Institute of Technology, (973)-642-7031, david.g.shirokoff@njit.edu
- **Anand U. Oza**, Assistant Professor of Mathematical Sciences, New Jersey Institute of Technology, (973)-642-7031, david.g.shirokoff@njit.edu
- **William Limm**, Chemist, FDA-CFSAN, (240)-402-1678, william.limm@cfsan.fda.gov.