

Chenwei Zhang

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SUMMARY OF QUALIFICATIONS

- Experienced programming with Python in the fields of machine learning, deep learning, NLP, optimization, and biomedical application.
- Professional research experience in the fields of semiconductor nanocrystals, spectroscopy analysis, plasmon and phonon coupling, diluted magnetic semiconductor, and photoluminescence.
- Academic experience in the fields of machine learning, deep learning, optimization, calculus, linear algebra, statistics, quantum mechanics, nanotechnology, computational (bio)chemistry, and physical/organic chemistry.
- Experimental research skills in the laboratory related to semiconductor nanocrystal synthesis, inorganic chemistry experiment design, and rechargeable aqueous battery assembling.
- Skilled at data visualization, data analysis, and data mining by machine learning and deep learning methods.
- Excellent teamwork experience and strong learning capabilities (accomplish bachelor's degree within three years) | Good academic writing and communication skills | Superior leadership skills in academia | Efficient time management skills | Strong multi-tasking skills | Knowledgeable in interdisciplinary science.

TECHNIQUE SET

- **Programming language:** Python | C | Linux System Manipulations
- **Industry knowledge:** Machine Learning | Deep Learning | Natural Language Processing | Data Visualization | Programming in Biomedical Application
- **Scientific software:** TensorFlow | MATLAB | PyTorch | Origin Lab | Microsoft Office Sets | Adobe Sets

LABORATORY EXPERIENCE

Master Research Program

Full-time Sept. 2018 - Present

Professor Dr. Pavle Radovanovic | University of Waterloo, Waterloo, ON

- Carried out four major projects in my master's thesis: three of them are focused on the localized surface plasmon resonance (LSPR) in semiconductor nanocrystals (NCs) and the rest one is studying diluted magnetic semiconductor (DMS).
- Antimony doped tin oxide (ATO), n-type semiconductor system:
 - Synthesize varying dopant ATO NCs by two different methods, solvothermal and sol-gel synthesis.
 - Study the LSPR properties of as-synthesized ATO NCs via UV-Vis-NIR and FTIR spectroscopies.
 - Explore the plasmon and exciton coupling mechanism by magnetic circular dichroism (MCD) spectra.
 - Use Raman spectroscopy to study the phonon transformation in the LSPR phenomena.
- Copper chalcogenide (Cu_xS_y), p-type semiconductor system:
 - Synthesize CuFeSSe NCs by colloidal synthesis method under noble gas condition.
 - Study the "pseudo LSPR" properties of as-synthesized NCs via UV-Vis-NIR spectroscopy.
 - Observed the crystal structure and elemental ratio of the four-component CuFeSSe NCs.
 - Use the MCD spectroscopy to verify my perspective of the "pseudo LSPR" property.
- Gallium iron oxide (GFO), both p- and n-type semiconductor system:
 - Tune the iron content to get different p- and n-type semiconductor by colloidal synthesis.
 - Observe the distribution and shapes of different types of GFO NCs via TEM and SEM measurements.
 - Study the paramagnetic properties of GFO NCs by physical property measurement system (PPMS).
 - Use the MCD spectroscopy to acquire exact information to further argument of the unique bipolar GFO.
- Cadmium oxide (CdO) system:
 - Attempt different transition metals such as Mn, Cr, and Co dopant to CdO NCs by colloidal synthesis.
 - Use the MCD spectroscopy to study the diluted magnetic semiconductor (DMS) properties in CdO.
 - Study the DMS properties of as-synthesized CdO NCs via UV-Vis-NIR and FTIR spectroscopies.

Undergraduate Laboratory Research Project

Part-time Dec. 2017 - Aug. 2018

Professor Dr. Pu Chen | University of Waterloo, Waterloo, ON

- Proposed a novel approach to improve the charge/discharge performance of aqueous rechargeable batteries which use zinc ions as electrolyte and vanadium (V) oxide as cathode.
- Took a ball milling method to grind and blend cathode materials to increase the specific surface area of them.
- Increased the weight percentage of binder to enhance the adhesion of cathode materials and conductive agents.
- Coated polymer LA133 on cathode foils to prevent absorbing surrounding moisture so as to stabilize batteries.
- Designed cells reaching much higher capacity up to 180 mAhg⁻¹, longer lifespan as operating 300 cycles, and more robust stabilization compared to the original ones.

Research Inter & Team Leader

Part-time Jun. 2016 - Jul. 2017

Professor Dr. Yuliang Zhao | National Center for Nanoscience and Technology, Beijing, China

- Applied “China Academy of Sciences Students' Innovative Practice Training Program 2017” as a project leader and conducted a one-year project on cancer treatment via nanomedicine.
- Read numbers of related literature about curing breast cancer in the beginning; then wrote the proposal and assigned each member's task.
- Proposed that using CTCE9908 and docetaxel to construct self-assembled nanostructures as prodrugs through responsive peptide coupling and taking advantage of the respective functions of the two drugs to synergistic treat the metastatic breast cancer.
- Spliced the polypeptide inhibitor CTCE9908 with a segment of responsive peptide MMP-2, and then coupled it with docetaxel forming amphiphilic molecules to assemble into nano-micelles.
- Constructed drug-loaded nanoparticles and improved the targeting ability of docetaxel to a certain extent.

EDUCATIONAL BACKGROUND

Master of Science

Sept. 2018 - Present

Faculty of Science, University of Waterloo

- Major: Chemistry (Nanoscience)
- Grades: 91.79/100 | GPA: 4.0/4.0 | Top 1%
- Courses: Data and Knowledge Modeling and Analysis, Tools of Intelligent Systems Design, Optimization, Python Programming for Scientific Data Analysis, Computational Chemistry, Nanotechnology

Bachelor of Science (Dean's Honours List)

Sept. 2015 - Aug. 2018

Faculty of Science, University of Waterloo

- Major: Materials and Nanosciences
- Grades: 86.38/100 | GPA: 3.90/4.0 | Top 5%
- Courses: Statistical Mechanics, Quantum Mechanics, Chemical Kinetics, Biomaterials, Biophysics, Solid State, Electricity and Magnetism, Electrical and Optical Properties of Materials, Polymer Materials

Bachelor of Engineering

Sept. 2015 - Jul. 2017

Faculty of Science, Beijing Jiaotong University

- Major: Nanomaterials and Nanotechnology
- Grades: 86.80/100 | GPA: 3.68/5.0 | Top 10%
- Courses: Calculus I/II/III, Linear Algebra, Differential Equations, Statistic, C Programming, Fundamentals of Computers, Biochemistry, Cell Biology, Mechanics, Physical/Organic Chemistry, Quantum, Nanoscience

Others

- Machine Learning (Coursera, Apr. 2020)

ACADEMIC PROJECTS

Quantum Valley Investments Problem Pitch Competition

May 2020 - Jul. 2020

University of Waterloo

- Teamed up three people (team name: Alpha T) to compete for this problem pitch in aim to win the final funding for the future research and founding a startup.
- Came up with the challenge of training data quality problems in artificial intelligence, especially in the healthcare AI market, seeking a solution to deal with this tricky problem.
- Did a lot of in-depth market investigations and academic research related to this data issue; and completed the application form of Billion Dollar Problems.

- Scheduled several meetings among our team members, and 1:1 online meeting with mentor Kevin Li to discuss, exchange our ideas and improve our research.
- Stop at the final presentation part. But we learned a lot from this competition.

Kaggle Competitions – Fashion MNIST & COVID-19 Study

Mar. 2020 - Apr. 2020
University of Waterloo

- Fashion MNIST
 - Attempted different machine/deep learning algorithms such as Random Forest, Support Vector Machine, Convolutional Neural Network, and Resnet 101 to analyze and classify the Fashion MNIST dataset.
 - Got 0.91180 high score via Resnet 101 algorithm eventually.
- COVID-19 Study
 - Used the Logistic Curve Model to predict the confirmed and death cases of COVID-19 in the United States and this model exhibited accurate prediction.
 - Won the bronze medal for this project finally.

WORK EXPERIENCE

Teaching Assistant

University of Waterloo, Waterloo, ON

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| • CHE 102 | Instructor: Prof. Yael Simakov | Sept. 2020 - Present |
| • CHEM 120L & CHEM 123L | Instructor: Prof. Sue Stathopoulos | Sept. 2018 - Apr.2020 |

PUBLICATIONS

- Chenwei Zhang *et al.* 2020 *ECS Trans.* **98** 77.
DOI: <https://doi.org/10.1149/09803.0077ecst>.
- Two more papers are ongoing.

HONORS & AWARDS

- 2018-09 – 2020-08: International Master’s Student Award (IMSA), Science Graduate Award (SGA), Research Graduate Scholarship, University of Waterloo
- 2018-05 & 2018-09: Dean’s Honours List, University of Waterloo
- 2017-2018: International Tuition Grant, University of Waterloo
- 2016-10, 2017-10 & 2018-10: Academic Scholarships (Top 10%), Beijing Jiaotong University
- 2016-11: Scholarship of Student’s Innovation, Chinese Academy of Science

ACTIVITIES

- Mentor of junior undergraduate students from 2+2 program in Spring 2018 at the University of Waterloo.
- Attended International Peer Community in Winter 2017 & Conversation Partner Program in Spring 2018.
- Member of UW Photo Club, skilled at digital SLR camera photography, photo editing and video clipping.
- Volunteered the “Explore China” project held by AIESEC from Jul. 2016 to Aug. 2016 in Beijing, China.
- Head of the Enrollment Association Shanxi Province Group in BJTU in Winter 2015.

LANGUAGE

- Chinese: Native language || English: Professional working proficiency