

**Apratim Chakraborty**  
PhD Student Mechanical and  
Mechatronics Engineering (Nano)  
86 Westwood Crescent  
Kitchener, ON, N2M 2L8

Tel: (519)-578-9604

[a6chakra@uwaterloo.ca](mailto:a6chakra@uwaterloo.ca)

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## SKILLS SUMMARY

- Seasoned user of COMSOL Multiphysics software for nano-scale modeling and simulations
- Utilized MATLAB for calculus, linear algebra and controls courses during undergraduate studies
- Developed two unique setups for spring SMAs using well-known design software SolidWorks
- Working knowledge of AutoCAD and worked with Eagle software for PCB schematic design
- Proficient in working with Microsoft Office suite for organizing and presenting technical data
- Good at programming in python, C++, C on Linux, Unix, and Windows platforms.
- Excellent problem solver and proficient in mathematics as demonstrated by grades above 80% in all calculus courses.
- Quick learner and need very little supervision to perform task as demonstrated by an improved work term rating 'Excellent' achieved in my second term at Sybase.
- Result-oriented and hardworking – completed my MASc degree in almost a year after being assigned a totally new project halfway through my degree.
- Great team player and can interact well with each member in a group – achieved success in several engineering design projects in 6 years of undergraduate and graduate studies at UW.
- Strong communication skills coupled with good overall attitude towards work.

## ELECTRICAL LAB EXPERIENCE

### Lab Cumulative for Linear Circuit Course:

- Effectively worked on six different analog linear circuit lab assignments with a partner and achieved a grade of at least 93% on each of them.
- Interconnected various circuit components such as resistors, capacitors on bread board and used DMM, oscilloscope to measure various electrical characteristics in the circuit
- Analyzed data and prepared detailed reports that determined current-voltage characteristics

### Engineering Design Project Course:

- Built schematic and layout of Traffic light PCB (Printed Circuit Board) using Eagle software.
- Ironed, Etched, Drilled and Soldered out the PCB for allowing circuit components to fit in and perform as a traffic light with red, yellow and green LEDs.
- Performed various hardware tests on breadboard to test correct functionality of PCB

## MECHANICAL WORK EXPERIENCE

**Mechatronics Engineering Department,  
University of Waterloo, Waterloo**

**May 1, 2015 – September 8, 2016**

### Job Title: MASc Candidate

- Performed laser-processing, cross-sectioning, wire-drawing and shape-setting on SMA wires.
- Designed and fabricated universal spring-making fixture for consistent spring manufacturing.
- Produced self-biased springs and optimized spring geometry to achieve maximum actuation.

## NANOTECHNOLOGY WORK EXPERIENCE

**Mechatronics Engineering Department,  
University of Waterloo, Waterloo**

**May 1, 2014 – April 30, 2015**

**Job Title: MASc Candidate**

- Started fabrication of miniature nanoelectronic devices
- Used various techniques such as EBL, RIE, Wet Etching and Lift-off for fabrication

**Mechatronics Engineering Department,  
University of Waterloo, Waterloo**

**January 1 – April 30, 2014**

**Job Title: Undergrad Research Assistant**

- Analyzed optoelectronic effects of graphene-polymer chains using COMSOL
- Demonstrated the impact of indentations on graphene-polymer nanoelectronic structure
- Examined mechanical strength of graphene-based nanoelectronic devices

**Mechatronics Engineering Department,  
University of Waterloo, Waterloo**

**September 9 – December 19, 2013**

**Job Title: Co-op Research Assistant**

- Simulated COMSOL models for graphene-based nanoelectronic devices
- Computed and analyzed thermal, mechanical and electrical characteristics of these devices

## SOFTWARE WORK EXPERIENCE

**SAP Inc.,  
Waterloo**

**January 7 – April 24, 2013**

**Job Title: Software Developer**

- Implemented C++ code to localize some tools for the next release of SAP Sybase IQ.
- Fixed bugs by debugging and testing code in unix, linux, windows and solaris.

**Sybase Canada Limited,  
Waterloo**

**April 30 – August 22, 2012**

**Job Title: Software Developer**

- Created new C++ class to add server and command line options for a particular Sybase IQ product used for internal debugging and testing.
- Implemented SQL procedure by modifying interactive SQL (\*.isql) file and adding code segments in specific Sybase library C++ program and header files.

## TEACHING EXPERIENCE

- ME 115: Structure and Properties of Materials
- ME 235: Materials Science and Engineering for Management Engineers
- ME 596: Introduction to Fabrication and Characterization of Nano-structures
- ECE 209 (Current): Electronic Materials and Devices

## EDUCATION

I am currently in my 5<sup>th</sup> term as a **PhD student in Mechanical Engineering (Nano)** at **University of Waterloo**. I completed my **MASc in Mechanical and Mechatronics Engineering** at **University of Waterloo, 200, University Avenue, Waterloo, Ontario** on September 8, 2016. I earned **BASc Electrical Engineering (Honours)** from **University of Waterloo** on June 14, 2014.

## CURRENT PROJECTS AND RESEARCH INTERESTS

- Simulation, Nano-Fabrication and Packaging of Graphene-based Field Effect Transistors
- Simulation of Nano-wire Bonding for NEMS electronic devices
- Reliability of thin-wire bonding for high power M/NEMS devices.

## PUBLICATIONS

### Book Chapter:

1. I. Novodchuck, A. Chakraborty, M. Irannejad, K. Musselman, M. Bajcsy, M. Yavuz, "Introduction", *Nano and Micro-Electro-Mechanical Systems (N/MEMS): Interconnections, Packaging, Testing and Reliability*, p. 1-18, 2017 - Submitted

### Conference Papers:

1. W. Ahmed, M. Irannejad, A. Chakraborty, M. Yavuz, "Numerical studies of thermoelectric cooling for a GaAs laser diode", EuroSimE International Conference on Thermal, Mechanical and Multi-Physics Simulation and Experiments in Microelectronics and Microsystems, 2018 – Accepted December 20, 2018
2. N. Udayakumar, A. Chakraborty, M. Irannejad, A. Brzezinski, M. Yavuz, "Effects of using 2D-material buffer layer on the wire bonding graphene-based devices", Poster Presentation, Graphene Conference, 4th ed., May 6-9, 2014, Tououse (France)
3. N. Udayakumar, A. Chakraborty, M. Irannejad, B. Cui, A. Brzezinski, M. Yavuz, "The Effects of Using Buffer Layers on Nanowire Bonding and Conductance Properties of Graphene-based Electronic Devices", Oral Presentation, IEEE Nano Conference, 14th ed., August 18-21, 2014, Toronto (Canada)
4. M. Yavuz, M. Irannejad, A. Chakraborty, N. Udayakumar, K.H. Ibrahim, W. Alyalak, A. Brzezinski, "Nano-bonding and Packaging Graphene/NEMS Devices", International Semiconductor Science Technology Conference, Izmir, Turkey, May 11-13, 2015.

### Journal Papers:

1. A. Michael, A. Chakraborty, Y. N. Zhou, M. Yavuz, M. I. Khan, "Design and Fabrication of a Novel Self-Biasing NiTi Spring Actuator", *Extreme Mechanics Letters*, 2017 – Rejected

## SCHOLARSHIPS

- Earned merit certificate in CHAMP (Credit Humber Association for Mathematics Professionals) contest held in 2006 and Canadian Open Mathematics Contest held in December 2008.
- Achieved University of Waterloo President's Entrance Scholarship and University of Waterloo Entrance Bursary in September 2009.
- Won Queen Elizabeth II Aiming for the Top Scholarship in September 2009.
- Obtained Graduate Research Studentship in May 2014 and 2017 at University of Waterloo.

## CURRENT COURSES

- NANO 702 (Completed) – Nano-scale Modelling – Professor Eihab Abdel Rehman
- NANO 701 (Completed) – Solid state devices – Professor Guo Xing Miao
- SYDE 682 (project) – Professor Eihab Abdel Rehman – Working on actuator design of curved beam using reduced order modelling (ROM).

## EXTRACURRICULAR ACTIVITIES:

- Won **first place** in softball intramurals league during 3<sup>rd</sup> and 4<sup>th</sup> academic years in undergrad studies at University of Waterloo
- Organized and setup various cultural events for local neighborhood in Kitchener.
- Led MME Graduate Student Association (MMEGA) and organized various events such as free Pizza and free ice cream for the MME Graduate Students.
- Captained intramural soccer team to the semifinals and remained undefeated in regulation time.
- MMEGA Co-President 2017/18:
  - Helped obtain a fixed budget from the MME department to fund academic and social events for MME graduate students.
  - Organized the 2<sup>nd</sup> ever MMEGA symposium and got raving reviews.

## PROFESSIONAL MEMBERSHIPS:

- Registered student member of **Professional Engineers of Ontario (PEO)** from September 2009 to 2014.
- Registered **Institute of Electrical and Electronics Engineers (IEEE)** student member from July 2014 to 2016.