

# PATRICK CHEN

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## KEY COMPETENCIES

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**Applied Optics:** Working knowledge of fibre optics, diffraction gratings, optical systems, lighting systems, and lasers

**Machine Vision:** Design of image acquisition systems and image understanding algorithms  
Fixtures and Apparatus

**Industrial Automation:** Working knowledge of actuators, motors, and sensors

**Nanofabrication Techniques:** Photolithography, e-beam evaporation, PECVD, atomic force microscopy, scanning electron microscopy

**Construction:** Mechanical design, precision machining, and electronic circuit layout/assembly

**Programming:** C, C++, Java, MATLAB, Perl

**Software Application:** Maple, NI LabVIEW, TracePro, AutoCAD, MS Office

**Languages:** English, French, and Cantonese

## EDUCATION

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**Master of Applied Science in Engineering Physics** 2017-2019

University of British Columbia, Vancouver BC, Canada

- Relevant technical courses: Laser, Statistics, and Signal Processing with Wavelets
- Recipient of the Natural Science and Engineering Research Council of Canada (NSERC) Post Graduate Scholarship (Masters)
- Thesis work presentation at the Canadian Associate of Physicists Annual Congress 2009

**Bachelor of Applied Science in Systems Design Engineering** 2012-2016

University of Waterloo, Waterloo ON, Canada

## CAREER HIGHLIGHTS

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**Computational Biologist – Genome Mapping** May 2016 – Apr 2017

*Canada's Michael Smith Genome Sciences Center, Vancouver, BC*

- Applied image processing and feature extraction algorithms to automatically track sample lanes in electrophoresis gels using C
- Implemented result-checking to achieve full automation of numerous inspection steps of a genome mapping analysis pipeline
- Designed and created user interface with Java to display results of analysis

**Imaging Systems Designer**

Jan 2014 – Apr 2014

*Advanced Systems Division, ATS Automation Inc., Cambridge, ON*

- Designed and constructed prototypes and test apparatus for integration of interdisciplinary systems: e.g. precision fluid dispense systems, air-tight packaging systems
- Designed and assembled image acquisition systems and image understanding algorithms for automated fabrication machines
- Performed validation and performance evaluation testing of custom automation machines

**Machine Build Technician**

Jan 2012 – Apr 2012

*Centerline (Windsor) Limited, Windsor ON*

- Interpreted technical construction details
- Fabricated custom components by precision machining (+/- .5mm).

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**RESEARCH EXPERIENCE**

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**Graduate Researcher**

May 2017 – Aug 2019

*Structured Surface Physics Laboratory, University of British Columbia, Vancouver BC*

- Fabricated and tested proof-of-principle prototypes of sub-micron active diffraction gratings for non-mechanical beam steering applications using electrophoresis of dye ion and nanoporous electrodes
- Validated an electron tunnelling model for electrochemical reaction threshold that enabled an improved optimization of device response time and lifetime

**Journal Publication:** Wong et al., *Applied Optics*, Vol. 48, Issue 6, pp. 1062-1072**Semester Project Student**

Mar 2015 – Jul 2015

*Advanced Photonics Laboratory, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland*

- Designed an interferometer and mechanical setup for the fabrication of fiber Bragg gratings in optical fibers
- Assembled an optical system for UV laser beam shaping
- Evaluated the setup through controlled performance tests

**Undergraduate Research Assistant**

May 2014 – Aug 2014

*Faculty of Environmental Studies, University of Waterloo, Waterloo ON, Canada*

- Implemented spatial autocorrelation algorithms in MATLAB for automated segmentation of remotely sensed images
- Identified user requirements through extensive interviews and feedback sessions

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**INTERESTS**

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- Classical music
- Black belt in judo
- Eco-travel & tourism