

Applicant: Jonathan Tien-Hui Wang (66741976)

Program: M.Sc. in Genome Science and Technology (VGMMSC-LE)

Entry period: September 2024

Application comments:

No comments available

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Application form
Resume
Statement of Interest/Intent
Transcripts & Diplomas – Unofficial
eReference (eRef) Responses
Reference Letter
AVAILABLE FOR USE

WANG, JONATHAN TIEN-HUI ()

66741976

Degree Selection

Submission Date: 26/Nov/2023

Campus	Program (VGMMSC-LE)	Academic Year	Term	Term Start
Vancouver	M.Sc. in Genome Science and Technology	2024-2025	W1	Sep 2024

Source of Interest

How did you find out about UBC?
Other
Found Online

Personal and Contact Details

Student Number		Family Name (Surname)		Preferred Name
66741976		WANG		
Title	Given Name	Middle Name	Former Family Name (Surname)	
MR	JONATHAN	TIEN-HUI		

Date of Birth	Gender	Country of Birth	Country of Current Citizenship
26/Sep/2001	Male	Canada	Canada
Dual Citizenship	Primary Spoken Language	Other Spoken Language	Visa Type
	English		

Address Line (1 & 2)			
12626 21A AVE			
City	Province, State or Region	Postal or Zip Code	Country
SURREY	BC	V4A7P6	Canada

Day Telephone Number	Evening Telephone Number	Email Address
6045357266	6043608423	jonthewang@gmail.com

Do you identify yourself as an Aboriginal person of Canada?
No
Do you identify yourself as a Racialized person?
No

Academic History

- Applicant indicates that they have attended UBC and other post-secondary institution(s). UBC Data should be available here on **November 27, 2023**.

McMaster University

Institution Country:	Canada
Start Date:	01/Sep/2019
End Date (or Expected End):	31/Mar/2023
Program of Study:	Integrated Sciences (Biophysics)
Credential Status	Conferred / Complete
Date Conferred:	30/Jun/2023
Credential Received:	Bachelor's
Awards & Honours received with this degree:	Degree: Summa Cum Laude Awards: Dean's Honour List – McMaster University (2023, 2022, 2021, 2020). McMaster Honour Award Scholarship (2019). BC Achievement Scholarship (2019).
Required to withdraw:	No
Self Reported GPA:	
Used for Basis of Admission to UBC:	Yes

GPA Calculations Summary

Calculation Name	Purpose	Date of Calculation	Minimum GPA Req'd	GPA Calculation	GPA Rank	Meets Progm Requirements	Meets UBC Requirements	First Class Standing?
Integrated Sciences (Biophysics)	Admissions	11/12/2023		3.79		Yes	Yes	Yes

University of British Columbia

Start Date:	05/Sep/2023
End Date (or Expected End):	30/Apr/2024
Program of Study:	
Category	Unclassified-V
Credential Status	Courses Only
Used for Basis of Admission to UBC:	No

Please see SISC for Awards or Honours awarded to this applicant.

Course Details

Academic Year	Session/ Term	Course #	Credit Value	Description	Grade		Credit Earned	Standing	Degree Program	Degree Level	Campus
2023	W2	BIOL 234	3	FUND GENETICS	CIP	CIP	CIP			GraduatePost-GraduateStandard TestsUndergrad	Vancouver
2023	W1	CPSC 221	4	BASIC ALG&DATA				AUD		GraduatePost-GraduateStandard TestsUndergrad	Vancouver
2023	W2	CPSC 340	0	MACHINE LRN MINE	CIP	CIP	CIP			GraduatePost-GraduateStandard TestsUndergrad	Vancouver
2023	W1	CPSC 545	3	ALG FOR BIOINFO	CIP	CIP	CIP			GraduatePost-GraduateStandard TestsUndergrad	Vancouver
2023	W2	STAT 540	3	STAT METH HD BIO	CIP	CIP	CIP			GraduatePost-GraduateStandard TestsUndergrad	Vancouver

Funding

Standard Questions

Primary Funding

SOURCE of the support	
DOLLAR amount	
Includes TUITION fees?	
WHEN the support will commence	
WHEN the support will end	

SOURCE of the support	UBC stipend plus some personal savings
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Please indicate the SOURCE(S) of any awards, scholarships, sponsorships or fellowships for which you have applied or will apply.	NSERC CGS-M
Please indicate the Canadian Dollar amount PER YEAR of support applied for.	\$17,500 per year
Please indicate the NUMBER OF YEARS of study this support would cover.	1 year
If you do not receive this financial support, will you be able to attend.	Likely
How do you plan to fund your studies?	UBC stipend plus some personal savings

Experience & Interests

Standard Questions

Areas of Interest

Faculty Members

Leslie, Sabrina
Hallam, Steven James
Gsponer, Joerg Anton

Please provide a brief statement of your academic and/or professional goals and how these align with this graduate program.
Please describe any research and/or work experience (including publications, etc.) you've undertaken that is relevant to your proposed field of study.

Program-Specific Questions

Briefly discuss your background in life sciences, including academic, work or other experiences that may assist the admissions committee. Please limit your response to one page.	My degree was in Integrated sciences which included a suite of life sciences classes first through third years. This included a first year which held the equivalent of the first year of a life science degree and a second year which had an emphasis on ecology. I concentrated on biophysics which included taking kinesiology classes. For my laboratory work, I worked on multiple practical life-science adjacent projects learning the life cycles of drosophila and studying biological condensation. Working on these projects involved researching a number of life science topics such as associated genetic and model subjects associated with biological condensation.
Briefly discuss your background in quantitative sciences (math, statistics, computer science, engineering, physics) including academic, work or other experiences that may assist the admissions committee. Please limit your response to one page.	My degree in integrated sciences acquainted me with advanced calculus and applications of computation to model biological and physical systems. I expanded my mathematical background while concentrating on biophysics by taking linear algebra, differential equations, and mathematical physics. My concentration in biophysics introduced me to a number of courses. Including statistical mechanics and thermodynamics courses which gave me a background in statistics. I gained experience using computational tools in a practical research context in a variety of research projects. These include data analysis of bicoid confocal image data for Fradin Lab, learning Monte Carlo testing methods during my NSERC, and the application of thermodynamic models to bicoid condensation during my thesis. This year I have taken Algorithms and Data Structure and Algorithms for Bioinformatics (grad) courses Next term I am taking Machine Learning courses to expand my computational science background.

Referee 1

Name	Dr. Chad Harvey
Job Title / Occupation	Associate Professor
Institution / Company / Organization	MCMASTER UNIVERSITY
Type of Reference	Academic
Address	1280 MAIN STREET WEST HAMILTON ONTARIO Canada
Referee Email / Website	harvech@mcmaster.ca
Telephone #	
Notes to Referees	

Referee 2

Name	Dr. Cecile Fradin
Job Title / Occupation	Professor
Institution / Company / Organization	MCMASTER UNIVERSITY
Type of Reference	Academic
Address	1280 MAIN ST W HAMILTON ONTRARIO Canada
Referee Email / Website	fradin@mcmaster.ca
Telephone #	
Notes to Referees	

Referee 3

Name	Dr. Olga Trichtchenko
Job Title / Occupation	Assistant Professor
Institution / Company / Organization	WESTERN UNIVERSITY
Type of Reference	Academic
Address	1151 RICHMOND ST LONDON ONTARIO Canada
Referee Email / Website	otrichtc@uwo.ca
Telephone #	
Notes to Referees	

Jonathan Wang

12626-21A Ave, Surrey B.C. CANADA, V4A-7P6
Tel. (604) 535-7265; E-mail: jonthewang@gmail.com

Research Interest

Investigation of small scale biological systems through quantitative methods and computational analysis.

Education

2019 to 2023 - McMaster University **H.B.Sc. Integrated Science (Medical & Biological Physics)**.

Summa Cum Laude

Cumulative GPA - **10.78/12.0** (3.79/4.0 or A-)

Major GPA - **10.86/12.0** (3.82/4.0 or A-)

2019 - **International Baccalaureate Diploma**

Awards

Dean's Honour List – McMaster University (2023, 2022, 2021, 2020).

NSERC USRA Scholarship - Western University (2022).

McMaster Honour Award Scholarship (2019).

BC Achievement Scholarship (2019).

Research Experience

2021 to 2023 – **Research Assistant** with Dr. Cecile Fradin at McMaster University (Molecular Biophysics Lab):

2022 to 2023 - **Undergraduate Thesis:**

Computationally Modelling Biological Condensation Processes of Bicoid from the Protein Sequence:
Applied a variety of computational models and tools to try and determine Bicoid's propensity to condensate in water from its sequence.

2022 - **Independent Research Project:**

Biophysical studies of Drosophila genetics using modelling and microscopy: Imaged Bicoid under a variety of optical settings using confocal microscopy to determine condensate existence.

2021 – **Summer Research Assistant:**

The effects of progenitor history on Drosophila nuclei: Researched, developed software (learned, designed, implemented with Mathematica) to analyse nuclei position data and determine previous locations.

2022 - **NSERC USRA** with Dr. Olga Trichtchenko at Western University (Physics Lab):

Instability studies of surface tension wave equations: Researched various alternative approaches; designed and developed software to efficiently analyse and test for instabilities using a modified Monte Carlo method.

2020 - **Enrichment Project** with Dr. Erin Clements at McMaster University (Mathematics Lab):

Applied Cryptography: History and Applications of Enigma and Hill cipher encoders and solvers.

2019 to 2022 - **Integrated Science Group Projects** at McMaster University:

2021 to 2022 - *Self-directed interdisciplinary research:* Wine chemistry and aging; Gravity Theory; and Climate Change policy proposals.

2020 to 2021 - *Multidisciplinary projects and coursework:* Ecological interactions; Neuroscience; and Thermodynamics.

2019 to 2020 - *Core scientific principles in modern frontiers:* Space travel; Sustainable energy; and Cancer treatments.

Science Communication

2020 - Poster Presentation (McMaster University): Biological model of the processing of caffeine.

2022 - NSERC Research Presentation (Western University): Instability of surface tension wave equations.

Computational Skills

System Modeling: Computational modeling of biological and physical systems.

- Self taught and implemented a program in Mathematica which fixed continuity matching errors in classifying positional data of Drosophila embryos.
- Simulated orbits and determined stability conditions of multiple planetary body systems) as part of a project modeling a roundtrip to Mars.
- Modeled the metabolic processing of substances in the body using differential systems.
- System modeling of thermodynamics, cancer treatment, and climate for projects.

Statistical Analysis: Computational processing, visualization and finding pattern and trends in datasets.

- Designed and developed algorithms to efficiently search for instabilities in wave equations.
 - Specifically understanding and modifying Monte Carlo Chain methods and related algorithms to solve the unique problem.
- Developed software for complex data analysis and fixing of nuclei position data to determine the existence of condensates in Drosophila embryos.
- Analyzed a variety of data types including wind data, growth data, etc. for various assignments.

Software Development (Design, Code and Verification):

- **Object-oriented** design and programming.
 - **Python and C++**
 - Familiarity with many computing libraries and complex applications.
 - Independently designed and developed software for both modeling and statistical data analysis based on broad directives.
- **Software development for modeling, data analysis and identifying statistically significant trends.**
 - **R** - Used R to analyze data to look for a variety of trends in data
 - **Mathematica** - Analyzed data using statistical analysis applications.
 - **MATLAB** – Analyzed climate change data, graphic data processing and linear algebra computations.
 - **Netlogo** - Developed software to model particles and organisms.
 - **ImageJ** - Tracking the motion of particles, graphing and analyzing the resulting data, clean visual data.

Lab Skills

Microscopy and sample preparation:

- **Confocal microscopy:** Developed expertise with the functional control, use, and maintenance of a high-power inverted confocal microscope (Nikon AIR HD25) in a time-limited setting to take fluorescent images, particularly single label GFP on Bicoid in Drosophila embryos.
- **Live Sample Preparation:** Prepared, harvested and decoronated Drosophila flies as well as took care of and bred them for imaging.

Integrated Science Laboratories:

- Chemistry wet lab experience in a variety of contexts, from titration, serial dilution, and the filtration and identification of material using Spectro-photometric equipment.
- Used a microscope in a variety of contexts, including identification of numerous microorganisms.
- Developed a method of analysis for quantifying a desired compound based on chemical properties.
- Well versed in uncertainty minimization, error analysis, and procedural refinement.
- Application of calibration, linear regression, and regression error analysis.
- Created laboratory procedures to titrate a chemical to certain concentrations and test live organisms.

Citizenship: Canadian

To whom it may concern,
University of British Columbia – Graduate Program of Genome Science and Technology

I am writing to you regarding my application to pursue a M.Sc. in Genome Science and Technology at UBC. I graduated from McMaster University in 2023, with a degree in Integrated Sciences concentrating in Medical Biophysics. I have spent my undergraduate career developing knowledge and research skills not only in physics, biology, and chemistry, but also in how the perspectives and knowledge of these fields can be brought together. My particular interest, which I hope to pursue in your department, is in investigating small-scale biological systems by applying or creating computational models that use experimental data.

Several different research experiences have helped develop my skills and interest in this area. Chief among these has been my work in the lab of Prof. Cecile Fradin over the past several years. My first project in the Fradin lab was to interpolate gaps in the history of nuclei position in *Drosophila melanogaster* embryos to help correlate the spatial history of an embryo's progenitors and the expression of the Hunchback gene in the nuclei which split from it. To get the answers I was interested in, I had to develop computational tools for both image analysis and statistics.

As I continued to do research in the Fradin lab, I got the chance to learn more about emerging problems in biophysics and *Drosophila* genetics. The problem I focused on was condensate formation inside the cell. It began experimentally, my project for the past year has been to use confocal microscopy to image embryos expressing GFP-tagged Bicoid protein. The purpose of this project was to find graphical evidence of Bicoid condensate formation by using confocal microscopic imaging under a variety of settings. In looking for these condensates, I learned research level microscopy skills and how to integrate coding analysis with collecting laboratory data for a complete project.

I created my senior thesis project in the Fradin Lab, an exploration of the novel hypothesis of bicoid forming biological condensates examined from a genetic and computational lens. My thesis explored whether the propensity for bicoid to biologically condensate could be indicated by its protein sequence. This was explored by adapting sequence specific thermodynamic models for protein condensation to bicoid's sequence and seeing whether bicoid's phase diagram indicated the propensity to phase separate in biologically relevant conditions.

My interest in computational modelling was strengthened by the NSERC won, which let me work with Prof. Olga Trichtchenko at Western University. During this NSERC, I analyzed, designed, and implemented Monte Carlo testing methods to create a probabilistic testing methodology for instabilities in the Kawahara wave equation. The project was completely self-directed: I researched the method of testing and the equation being analyzed. During this project I learned to enjoy the interplay between a theoretical analysis of a topic and building quantitative computational tools to support the research.

Near the end of my bachelor's degree realized that interest in computational projects would be aided by expanding my formal computer science experience. To aid this during the last year I have enrolled in some UBC classes as a non-degree student to expand my computational and statistic skillset to better prepare myself for future graduate projects. Several of UBC's faculty have drawn my interest. From Prof. Sabrina Leslie's CLiC Microscopy is creating novel visual data which could have interesting genomics research opportunities; to Prof. Joerg Gsponer's examination of protein aggregation and computational models of Intrinsically Disordered Protein (IDP) interactions; to Prof. Steven Hallam's lab using computational techniques to examine metabolic and energetic interactions which seems like a fascinating subject area.

In summary, I believe that my passion for understanding complex biological phenomena using computational techniques is shared by the faculty of the Genome Science and Technology program. I would like nothing more than to contribute to this research community. I thank you in advance for considering my application.

Jonathan Wang (Email: jonthewang@gmail.com)



Office of the Registrar
1280 Main Street West
Gilmour Hall, Room 108
Hamilton, ON L8S 4L8
Canada

Registrar's Signature

Transcript of Academic Record

Issued To:
Jonathan Wang
12626 - 21A Ave
Surrey, BC
Canada

Name:	Student ID No:	OEN:	Birth Day:	Print Date:
Jonathan Wang	400249570		26 September	09 August 2023

Transcript valid only if bearing the Registrar's Signature.

Degrees Awarded by McMaster University

Degree:	Honours Bachelor of Science
Plan:	Integrated Science (Medical & Biological Physics Concentration)
Confer Date:	15 June 2023
Degree Honors:	With Distinction

Beginning of Undergraduate Career Record

--- 2019 Fall ---

Program:	Science Honours
Plan:	Integrated Science (Honours)

Transfer Credit/Letters of Permission

Other Credits Applied Toward Science Honours

Subject/Course#	Title	Units	Grade
ENGLISH 1XXXX	ENGLISH 100 Level Unspecified	6.00	T
PHILOS 1XXXX	PHILOS 100 Level Unspecified	6.00	T
	Transfer Totals:	12.00	

Term Honours: The McMaster Honour Award, Level 3

Term Enrolment

Course	Title	Attm./Earned Units	Grade
BIOSAFE 1BS0	Biosafety Training	0.00/0.00	COM
ISCI 1A24A	Integrated Science I	0.00/0.00	MT
PHILOS 1B03	Philosophy, Law and Society	3.00/3.00	A-
WHMIS 1A00	Intro To Health And Safety	0.00/0.00	COM



Registrar's Signature



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Hamilton, ON L8S 4L8
Canada

Transcript of Academic Record

Name: Jonathan Wang Student ID No: 400249570 OEN: Birth Day: 26 September Print Date: 09 August 2023

Totals

	Attm./Earned Units	GPA Units	Total Points	GPA
Term Totals	3.0/3.0	3.0	30.0	10.0

--- 2020 Winter ---

Program: Science Honours
Plan: Integrated Science (Honours)

Term Enrolment

Course	Title	Attm./Earned Units	Grade
ISCI 1A24B	Integrated Science I	24.00/24.00	A
MATH 1B03	Linear Algebra 1	3.00/3.00	A

Totals

	Attm./Earned Units	GPA Units	Total Points	GPA
Term Totals	27.0/27.0	27.0	297.0	11.0

Academic Standing: Good Standing
Term Honours: Deans' Honour List

--- 2020 Spring/Summer ---

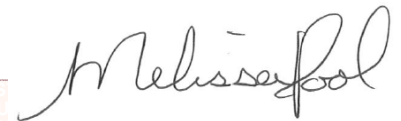
Program: Science Honours
Plan: Integrated Science (Honours)

Term Enrolment

Course	Title	Attm./Earned Units	Grade
MATH 2C03	Intro to Differential Equatns	3.00/3.00	A-

Totals

	Attm./Earned Units	GPA Units	Total Points	GPA
Term Totals	3.0/3.0	3.0	30.0	10.0



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Canada

Transcript of Academic Record

Name: Jonathan Wang Student ID No: 400249570 OEN: Birth Day: 26 September Print Date: 09 August 2023

--- 2020 Fall ---

Program: Science Honours
Plan: ISCI (Med & Biol Physics Conc) (Honours)

Term Enrolment

Course	Title	Attm./Earned Units	Grade
ISCI 2A18A	Integrated Science II	0.00/0.00	MT
KINESIOL 2Y03	Human Anatomy & Physiology I	3.00/3.00	A-
PHYSICS 2C03	Modern Physics	3.00/3.00	A+

Totals

	Attm./Earned Units	GPA Units	Total Points	GPA
Term Totals	6.0/6.0	6.0	66.0	11.0

--- 2021 Winter ---

Program: Science Honours
Plan: ISCI (Med & Biol Physics Conc) (Honours)


Term Enrolment

Course	Title	Attm./Earned Units	Grade
BIOPHYS 2S03	Exploration In Med & Bio Phys	3.00/3.00	A
ISCI 2A18B	Integrated Science II	18.00/18.00	A
KINESIOL 2YY3	Human Anatomy & Physiology II	3.00/3.00	B+

Totals

	Attm./Earned Units	GPA Units	Total Points	GPA
Term Totals	24.0/24.0	24.0	258.0	10.8

Academic Standing: Good Standing
Term Honours: Deans' Honour List



Registrar's Signature



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Canada

Transcript of Academic Record

Name: Jonathan Wang Student ID No: 400249570 OEN: Birth Day: 26 September Print Date: 09 August 2023

--- 2021 Fall ---

Program: Science Honours
Plan: ISCI (Med & Biol Physics Conc) (Honours)

Term Enrolment

Course	Title	Attm./Earned Units	Grade
ISCI 3A12A	Integrated Science III	0.00/0.00	MT
MATH 3C03	Mathematical Physics I	3.00/3.00	B
MEDPHYS 4B03	Radio.& Radiation	3.00/3.00	A+
PHYSICS 2G03	Scientific Computing	3.00/3.00	A+

Totals

	Attm./Earned Units	GPA Units	Total Points	GPA
Term Totals	9.0/9.0	9.0	96.0	10.7

--- 2022 Winter ---

Program: Science Honours
Plan: ISCI (Med & Biol Physics Conc) (Honours)

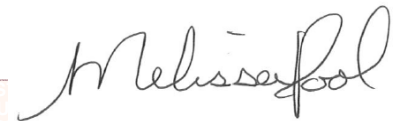
Term Enrolment

Course	Title	Attm./Earned Units	Grade
ISCI 3A12B	Integrated Science III	12.00/12.00	A
MEDPHYS 4I03	Introduction To Biophotonics	3.00/3.00	A
MEDPHYS 4T03	Physics In Medicin	3.00/3.00	A+
PHYSICS 3K03	Thermody/Stat.Mech	3.00/3.00	A

Totals

	Attm./Earned Units	GPA Units	Total Points	GPA
Term Totals	21.0/21.0	21.0	234.0	11.1

Academic Standing: Good Standing
Term Honours: Deans' Honour List



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Transcript of Academic Record

Name: Jonathan Wang Student ID No: 400249570 OEN: Birth Day: 26 September Print Date: 09 August 2023

--- 2022 Fall ---

Program: Science Honours
Plan: ISCI (Med & Biol Physics Conc) (Honours)

Term Enrolment

Course	Title	Attm./Earned Units	Grade
ISCI 4A12A	Integrated Science IV	0.00/0.00	MT
MATH 2UU3	Numbers for Life	3.00/3.00	A+
PHYSICS 2B03	Electricity and Magnetism I	3.00/3.00	B+
PHYSICS 3MM3	Quantum Mechanic 1	3.00/3.00	B-

Totals

	Attm./Earned Units	GPA Units	Total Points	GPA
Term Totals	9.0/9.0	9.0	84.0	9.3

--- 2023 Winter ---

Program: Science Honours
Plan: ISCI (Med & Biol Physics Conc) (Honours)

Term Enrolment

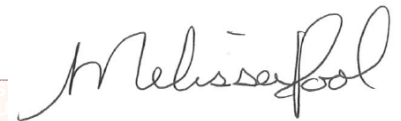
Course	Title	Attm./Earned Units	Grade
CLASSICS 2MT3	Ancient Roots:Med Terminology	3.00/3.00	C+
ISCI 4A12B	Integrated Science IV	12.00/12.00	A+
MUSIC 2MT3	Intro Music Therapy Practice	3.00/3.00	A+

Totals

	Attm./Earned Units	GPA Units	Total Points	GPA
Term Totals	18.0/18.0	18.0	198.0	11.0

Academic Standing: Clear to Graduate

End of Undergraduate Career Record



Registrar's Signature



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Canada

Transcript of Academic Record

Name:	Student ID No:	OEN:	Birth Day:	Print Date:
Jonathan Wang	400249570		26 September	09 August 2023

End of Student Official Transcript

McMaster University Transcript Legend

UNDERGRADUATE, CENTRE FOR CONTINUING EDUCATION, AND INDEPENDENT CAREERS GRADING SCALE (effective September 1982)

GRADE	POINTS	EQUIVALENT PERCENTAGES
A+	12	90 – 100
A	11	85 – 89
A–	10	80 – 84
B+	9	77 – 79
B	8	73 – 76
B–	7	70 – 72
C+	6	67 – 69
C	5	63 – 66
C–	4	60 – 62
D+	3	57 – 59
D	2	53 – 56
D–	1	50 – 52
F	0	0 – 49

Graduation with Distinction is based on a minimum 9.5 GPA over the entire program of study.

Deans' Honour List is based on a minimum 9.5 GPA on at least 30 units since last assessed.

Provost Honour Roll is based on a 12.0 GPA on at least 30 units since last assessed.

Course Credit

Courses are rated in terms of units. A unit normally consists of one lecture hour per week per term or one laboratory period of not less than two and not more than three hours per week per term.

GRADUATE STUDIES GRADING SCALE (effective September 2012 for MBA and September 2002 for other graduate programs)

GRADE	POINTS
A+	12
A	11
A–	10
B+	9
B	8
B–	7
F	0

Current Graduate Course Designations

Graduate courses are designated to count towards the student's primary academic program, unless the student has identified the course to count for another program, using a requirement designation.

MASTER OF THEOLOGICAL STUDIES & MASTER OF DIVINITY GRADING SCALE (effective September 1982)

GRADE	POINTS	EQUIVALENT PERCENTAGES
A+	12	90 – 100
A	11	85 – 89
A–	10	80 – 84
B+	9	77 – 79
B	8	73 – 76
B–	7	70 – 72
C+	6	67 – 69
C	5	63 – 66
C–	4	60 – 62
D+	0	57 – 59
D	0	53 – 56
D–	0	50 – 52
F	0	0 – 49

Dean's Honour List is based on a minimum 9.5 GPA on at least 27 units. Students who continue to achieve a 9.5 GPA will remain on the Dean's Honour List.

NON-NUMERIC GRADES

AS – Advanced Standing	INC – Incomplete	P+ –Pass with Distinction
AUD – Audit	IP – In Progress	SAT –Satisfactory
CAN – Cancelled	MT – Multi-Term	T –Transfer Credit
COM – Completed	NC – No Credit	U/S – Unsatisfactory
CR – Credit	NMR – No Mark Received	LWD – Late Withdrawal
DEF – Deferred Examination	P – Pass	W –Withdrawn
F – Fail		XCH –Exchange

TERM AVERAGE

Term Grade Point Average (Term GPA) is a weighted average based on the grades obtained in courses taken in a given term within the same career at McMaster University.

NOTATIONS

EXTRA – Extra credits not used towards degree	REPEAT – Subsequent attempt of a previous failed course
	UPGRADE – Subsequent attempt of a previous passed course
	(R) – Repeat of a previous course

MCMASTER UNIVERSITY MD PROGRAM - CURRICULUM OUTLINE

Note: The curriculum outline, effective August 2019, is available at <https://registrar.mcmaster.ca/legend>

Pre-Clerkship = 61 weeks		Clerkship = 63 weeks	
Medical Foundation 1 - 13 weeks	<ul style="list-style-type: none">• Oxygen Supply and Demand		<ul style="list-style-type: none">• Electives (17 weeks)• Anesthesia (2 weeks)• Emergency Medicine (4 weeks)• Family Medicine (6 weeks)• Medical Subspecialty (2 weeks)• Medicine (6 weeks)• Obstetrics and Gynecology (6 weeks)• Orthopedic Surgery (2 weeks)• Pediatrics (6 weeks)• Psychiatry (6 weeks)• Surgery (6 weeks)
Medical Foundation 2 - 9 weeks	<ul style="list-style-type: none">• Energy and Metabolic Homeostasis		
Family Medicine Clinical Experience - Longitudinally during Pre-Clerkship			
Medical Foundation 3 - 9 weeks	<ul style="list-style-type: none">• Renal System• Acid Base• Reproduction• Genetics		
Medical Foundation 4 - 10 weeks	<ul style="list-style-type: none">• Host Defence• Neoplasia• Genetics		
Post Medical Foundation 4 Elective - 7 weeks		Concept Integration and Review (6 weeks)	
Medical Foundation 5 - 13 weeks	<ul style="list-style-type: none">• Movement Control• Interactivity and Communication• Locomotor System• Nervous System• Behaviour		• Linking Basic Concepts to Clinical Decision-Making
		Professional Competencies Curriculum	
			• Longitudinally Across Entire Program
		Interprofessional Competencies	

* Historical transcript legend information available on the Office of the Registrar website: registrar.mcmaster.ca/legend/historical

Honours Integrated Science (iSci) Program

The **Honours Integrated Science program (iSci)** is the latest addition to McMaster's suite of elite, limited enrolment (max. 60 students/year) undergraduate programs targeted toward highly motivated, high achieving students. iSci is an interdisciplinary, research-based science program that focuses on the development of self-directed learning skills in a supportive and collaborative environment.

The iSci program is both challenging and demanding. Students graduating from the program will be very well prepared for graduate studies, professional schools and/or employment in government or industrial scientific research and development agencies.

First year: ISCI 1A24

This single course is the equivalent of eight 3-unit first year courses and integrates traditional first year science content and skill development in the disciplines of mathematics, life sciences, chemistry, physics and Earth science as well as science literacy. Student learning within ISCI 1A24 is organized around central themes, such as Size & Scale or Populations, and is focused on project topics such as Planetary Explorations, Sustainable Energy in Challenging Environments and Cancer. Each project challenges students with hands-on research problems, and student learning is supported by interactive concept seminars (iConS), labs and field trips.

ISCI 1A24 is taught by interdisciplinary teams of instructors who are responsible for delivery of much of the course content in the early part of Term 1. As the course progresses students transition into a mode of self-directed learning through guided research projects. Students completing ISCI 1A24 have very well developed research, inquiry, critical thinking, laboratory, field, and communication skills.

First year 'equivalencies'

ISCI 1A24 serves as an equivalent for prerequisite purposes to any of the following courses: Calculus for Science I & II (MATH 1A03, 1AA3); Cellular & Molecular Biology (BIO 1A03); Biodiversity, Evolution & Humanity (BIO 1M03); Introductory Chemistry I & II (CHEM 1A03, 1AA3); Earth & the Environment (EARTH SC 1G03); Introductory Physics (PHYSICS 1A03); Introduction to Modern Physics (PHYSICS 1AA3); Introduction to/Foundations of Psychology, Neuroscience and Behaviour (PSYCH 1X03, 1XX3).

Second Year: ISCI 2A18

The second year iSci course consists of 5 project modules, each focusing on a different topic considered to be essential learning for interdisciplinary science students. Students learn module content through iConS, field and lab work and collaborative research projects. ISCI 2A18 also includes mathematics, science literacy and lab practicum. Students can elect to focus their elective courses in specific discipline areas to fulfill the academic requirements of a 'concentration' (similar to a combined honours program).

Second year 'equivalencies'

ISCI 2A18 serves as an equivalent for prerequisite purposes to any of the following courses: Proteins & Nucleic Acids (BIOCHEM 2B03, 2BB3); Cell Biology (BIO 2B03); Fundamental & Applied Ecology (BIO 2F03); Equilibria & Kinetics (CHEM 2PD3); Bio-physical Chemistry (CHEM BIO 2P03); Earth History (EARTH SC 2E03); Basic & Clinical Neuroscience (PSYCH 2NF3); Neuroanatomy & Neurophysiology (PNB 2XB3); Fundamentals of Neuroscience (LIFE SCI 2CC3); Calculus III (MATH 2A03); Advanced Calculus I (MATH 2X03); Thermodynamics (PHYSICS 2H04); Research Methodologies (LIFE SCI 2A03).

Honours Integrated Science (iSci) Program

Third Year: ISCI 3A12

The third year iSci course consists of 3 group research project modules and 1 independent project. Students work in groups to explore the areas of Wine Science, Astrophysics and Climate Change. In the second term students have the opportunity to explore an area of research in an independent research project. This independent project will provide the students with a training ground for future thesis work in fourth year.

Fourth Year: ISCI 4A12

The fourth year iSci course allows students to conduct team-based and independent research theses and continue development of scientific, communication and leadership skills. Students participate in an interdisciplinary seminar with their peers while also completing a nine-unit thesis. A student's thesis can be completed in their area of concentration or outside this area.

Integrated Science Program Transcript

Student Name: Wang, Jonathan

Student #: 400249570

Concentration: Medical & Biological Physics

Level: 4

Session	Course	Discipline	Weight (%)	Grade
Fall/Winter 2019-20	ISCI 1A24 <i>composed of</i>	Mathematics	20	A+
		Physics	20	A-
		Chemistry	20	A
		Life Science	20	A-
		Earth Science	10	A
		Scientific Literacy	10	B+

Session	Course	Discipline	Weight (%)	Grade
Fall/Winter 2020-21	ISCI 2A18 <i>composed of</i>	Plant-Animal Interactions	11.66	A
		Neuroscience	11.66	A-
		Drug Discovery	11.66	A-
		History of the Earth	11.66	A
		Enrichment Project	10	A+
		Mathematics	11.66	A
		Laboratory Practicum	13.3	A
		Thermodynamics	11.66	A-
		Scientific Literacy	6.7	A-

Session	Course	Discipline	Weight (%)	Grade
Fall/Winter 2021-22	ISCI 3A12 <i>composed of</i>	Wine Science	22.5	A
		Light, the Universe And Everything	22.5	A+
		Climate Change	22.5	A
		Independent Project	22.5	A
		Scientific Literacy	10	B+

*****END OF RECORD*****

The breakdown herein identifies the discipline-specific grade distribution used to calculate the ISCI grades to date



Ana Campos
Director
School of Interdisciplinary Science

November 29, 2023

To Whom It May Concern,

I am writing a letter to recommend Jonathan for the graduate program in my capacity as their research supervisor during summer of 2022 when they held a Natural Sciences and Engineering Research Council (of Canada) Undergraduate Summer Research Award. They worked in my group on a method for sampling instabilities of solutions to nonlinear models describing water waves.

The project Jonathan was working on was very mathematically and computationally involved. Jonathan had to also understand two different fields of research, nonlinear waves and Bayesian statistics, as well as be able to read and run previously written code which had was not well documented. The student was able to grasp the goals and even translate that into some computational methods. However, since the project was too technical, they were unable to complete it by the end of the summer. Regardless, we have both gained more insight into the research.

Overall, Jonathan is a very easy person to work with and very independent. They were able to grasp the goals of the project and find supporting literature and recreate the algorithms in Python. The department has been lucky to have such an eager and enthusiastic student. I would be more than happy to continue working with the student if they choose to do a graduate degree under my supervision and I believe the student would be an asset to any group.

Sincerely,



Olga Trichtchenko
Assistant Professor

Cécile Fradin

Professor
905-525-9140, ext: 23181
fradin@physics.mcmaster.ca

Hamilton, November 30, 2023

Dear Sir/Madam,

It is my great pleasure to write this letter to support the application of Jonathan Wang to your graduate program at UBC. I have had the pleasure to interact with Jonathan as an academic instructor when he took one of my classes back in the winter of 2021, and then as a research supervisor. He joined my research group first as a summer student (summer 2021) and then as a 3rd and 4th year thesis student (September 2021- April 2023). Jonathan is a fantastic student, whose (already excellent) grades do not entirely do justice to his intelligence and originality. I would definitely place him in the best 5% academically, of the students I have taught in a small class setting (several hundreds in total).

Jonathan graduated from the iSci program at McMaster University. This program is small (~40 students per year) and very difficult to get into - only a very small percentage of applicants are successful. It is characterized by its inter-disciplinarity (students continue to study all sciences, with the possibility to concentrate in one area starting in second year) and by its pedagogical methods based on self-directed learning. Students in this program were all brilliant in high school, but are also distinguished by their capacity to inquire, reason and communicate. Even amongst this cohort, Jonathan stands out, not only because of his excellent grade point average (he is an "A" student), but because of his originality and personality.

Jonathan obtained a final grade of A in the course he took with me (Biophysics 2S03: Explorations in Biophysics). This course involves several very different components (written assignments, oral presentations, computer programming, lab experiments), designed to develop and test different skills. Jonathan did very well in all aspects of the course, proving he is an intelligent and dedicated student with broad interests. However, what stood out for me was one particular event: Students were asked to submit a short assessment of their peers' journal club presentations, and whereas in general these assessments remain quite superficial ("Speaking too fast", "Slides overcrowded", etc...), Jonathan's were incredibly insightful. He was able to capture in a few sentences the strengths and weaknesses of each of these presentations, going straight to what was most important. I had never been so impressed by the wit and judgment of a student in that context.

Because I had noticed Jonathan amongst the 70+ students who took the course that year, when he asked to join my lab for the summer, I accepted despite my best judgement (the lab was more than full, and we had been asked to work entirely remotely because of the pandemic). But I never regretted this decision. Although he was working on a completely voluntary basis, and remotely, Jonathan worked hard that summer, on an image analysis project we decided on together. He looked at the result of tracking data for nuclei in fly embryo over several nuclear division, to try and see whether transcription of an artificial gene showed any sign of "memory" (epigenetic signaling) from one nuclear cycle to the next. For his third year thesis, Jonathan asked to do an experimental project, and he got to collect some of the confocal images of developing fly embryos that he had worked on analyzing the summer before. For his 4th year project, he worked on modelling the formation of

protein condensates around transcription sites, to try and explain some of the observations made in the confocal images of fly embryos that he collected.

As a researcher, Jonathan stands out, just like he did as a student. He is curious, hard working and very creative. He learns new concepts and techniques very quickly - for example he taught himself to use Mathematica in a matter of weeks during his first summer, and picked up confocal microscopy without a hitch. Still, his mind works even quicker, and one challenge has been for him to bring up his technical skills to the level where he can implement his ideas as quickly as he is generating them. He always sees the big picture, and is increasingly mature in his critical thinking. Once he has acquired all the skills he need, I believe he will turn into an outstanding researcher, and I am looking forward to see where his career will go.

Finally, working with Jonathan is a real pleasure. His mind is incredibly fast and complex, and he has a self-deprecating sense of humour which is very endearing. He will need to learn to slow down when making oral presentations for the sake of clarity. In contrast, he is a brilliant writer when he takes the time to organize his ideas.

Jonathan is capable of great things, and I would keep him on as a graduate student without any hesitation if he had wished to stay at McMaster. I recommend him without any reservation.

Sincerely,

Cécile Fradin.



Dec. 7th, 2023

To whom it may concern,

I am writing in the highest recommendation for Jonathan Wang to be accepted in to the M.Sc. in Genome Science and Technology Program at the University of British Columbia. Jonathan is an inquisitive and very intelligent individual who enjoys learning and tackling scientific challenges. He couples his scientific proficiencies with dry humour and highly adept technical skills. This combination of characters will ensure his success during the challenges of graduate school. Knowing Jonathan's motivations to experience diverse learning environments, coupled with his desire to achieve in challenging situations, I have no doubt that he will be a positive contributor to the research program.

I am a professor in the innovative Honours Integrated Science Program (iSci) at McMaster University. I have known and interacted with Jonathan during all four years of his undergraduate degree. He is motivated by a desire to learn and not afraid to ask questions to seek a thorough understanding of many topics. Jonathan seeks out diverse opportunities to both learn and apply what he has learned. To exemplify this, Jonathan pursued his undergraduate education at McMaster, in Ontario, demonstrating that he already has the drive to seek challenge. Jonathan possesses a highly interdisciplinary and holistic worldview of how fundamental and applied science can advance and benefit society. This view is exemplified through Jonathan combining his Integrated Science degree program with a concentration in Biophysics. He sees the linkages between fundamental concepts and can apply them to problems in biophysics and extend to applications across scientific disciplines. He gets the big picture and understands the importance of details. He is an innate interdisciplinary thinker and can synthesis physical and soft matter concepts to both fundamental and applied problems.

Jonathan is a team player and enjoys being a participant in solving complicated challenges. He is quick to figure out potential solutions yet can incorporate feedback and ideas from his peers into making more informed conclusions. He will quickly admit when he is wrong or admit when a peer has come up with a better idea than himself. This humility is a valuable character that Jonathan couples with an insatiable desire to research all avenues of a research problem.

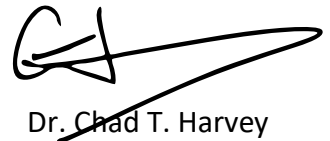
Academically, Jonathan excels, particularly given the demands of the iSci Program. The iSci program integrates the curriculum of Math, Physics, Chemistry, Biology and Earth Science into a single, hands-on research-based program. Students, in iSci, learn the required discipline concepts and curricula through collaborative, research projects, and not just absorbing material in a lecture setting. The entire design of the Program is to establish in our students, starting in the first year, a sense and appreciation of what is real science. The goal is to link science from multiple disciplines and readily apply it to big questions that are relevant to society. In addition, we require the students to develop their skills in science literacy, combining reading, writing,

critiquing scientific literature and presentation skills. This program is demanding and a lot of work; Jonathan's academic record speaks for itself. In particular, and in even in direct comparison to his peers, he thrives in the research environment. Jonathan is at his best and most confident when faced with a research problem, even when the exact tools or methodologies are not presented to him. He excels at problem solving, thinking outside the box and improvising. He has a true knack for stepping back, analysing a problem from several complimentary perspectives, and re-evaluating a plan of attack. As such, he is truly interdisciplinary in his pursuit of science.

It is my pleasure to recommend Jonathan Wang for the M.Sc. in Genome Science and Technology Program at UBC. Jonathan has taken the time to choose his next academic career path. He is one of those few individuals that inherently has an interdisciplinary perspective. I know that he will achieve and advance with the experience provided by this next degree.

I look forward to seeing all that he will achieve in his bright future!

Sincerely;

A handwritten signature in black ink, appearing to read 'Chad T. Harvey', with a long horizontal stroke extending to the right.

Dr. Chad T. Harvey
Associate Professor
School of Interdisciplinary Science

