

# **Teaching Dossier**

**Runjhun Saran Narayan**

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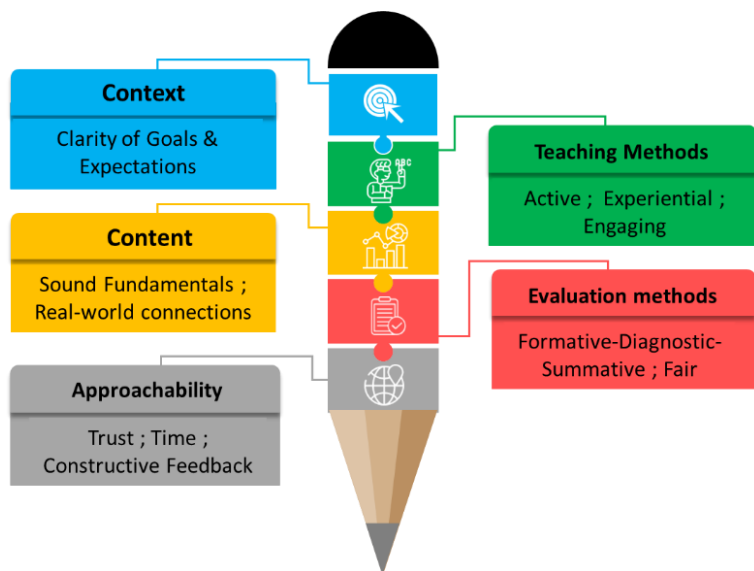
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## 1. Statement of Teaching Philosophy

My 5-fold teaching philosophy resonates very well with that of the McMaster University. I am ‘learner centered’ and ‘pursuit of truth’ is my core value. *My teaching vision overlays with that of McMaster University i.e. ‘Impact, Ambition and Transformation through Excellence, Inclusion and Community: Advancing Human and Societal Health and Well-being.’* I aim to raise future-ready individuals who will transform where they live, work, and continue to learn. Within my teaching experience, I have interacted with more than 1200 undergraduate students as a Teaching Assistant, and as a Course Instructor. I have successfully completed the **Certification of University Teaching** from the Center for Teaching Excellence, University of Waterloo, Canada. My teaching is built upon the idea of ‘**substantiation of fundamentals**’ and ‘**enhancement of multidisciplinary knowledge for innovative solutions**’. I believe in facilitating students’ understanding of the class topics, not only to **foster skills required to succeed in the course**, but also to **enable them to innovate solutions for real-world problems**. The instructors’ and students’ evaluations of my teaching have always been positive.



I apply teaching methods that demonstrate my **genuine interest in the student’s success**. As a facilitator, I foster a **friendly, inclusive, and trustworthy atmosphere** in class which makes me **more approachable**. I start the session by sharing my background and some personal experiences. I try to **know my students’** awareness of the subject, and their academic and career aspirations, **by quick writing-based or oral activities e.g. ‘one-minute paper’ or ‘pass the mic’, etc.** I often draw students’ attention towards the class topic by emphasizing its **significance in the real-world applications**. I diligently try to create opportunities for **inviting successful entrepreneurs or engineers working in state-of-the-art organizations as guest lecturers**, to talk about their struggles, experiences, and future ideas. Engaging the students in this way **helps me to connect with them, bolsters students’ passion and keeps them interested**, which finally results in **enthusiastic participation** in class activities, and **better academic performance**. I believe that **lecturing remains indispensable** to any bioengineering or biochemistry class, in order to cover the vast course contents. I consider the **primary attributes of productive lectures to be sound knowledge, confidence, methodical organization, and result oriented interaction**. I make sure the students are provided with relevant **thought-provoking readings prior to the class** to streamline their ideas. This gives me a platform to probe them with related questions and gauge their level understanding before I start. I further continue creating an **effective environment by making my lectures systematic and easy to follow**. The organization of my presentations is especially highlighted and appreciated by the students when I provide **high-level overviews (e.g. concept maps, flowcharts)** of certain ideas or discussion-based problems. Moreover, I engage the students in **game-based learning techniques** whenever needed. These can either be individually played so that they learn to **think independently (e.g. clickers, kahoot, etc.)**, or can be **team-based (e.g. ‘think-pair-share’)** which inculcates team spirit, exposes them to multitudes of perspectives, and teaches them to extract the best out of all ideas. In my experience, **higher motivation levels, and better understanding of concepts through such interactive activities** is evident from the students’ progressive academic performance.

I am a supporter of the ideology that **continuous assessments provide not only summative, but excellent formative as well as diagnostic opportunities** for both the students and the teachers. I feel an instructor’s responsibility lies not only in assessing the students well but also in preparing them for assessments. I begin with a **quick lecture review of the previous class**, this assists the students in identifying their shortcomings and sometimes even resolving the basic-level issues they have been struggling with. **I conduct feedback activities like ‘True/False’, ‘muddiest point’, ‘debates’, ‘polling’, etc.** in between lectures, to analyze where the students’ are lacking. I make sure that the **weightage of marks given to formative / diagnostic evaluations are in balance with the summative ones**. Such activities make the **evaluation scheme transparent and gains trust** from all students. This also makes the students ask better and in-depth questions regarding concepts.

My academic experience has provided me with a deep understanding of student supervision, and has prepared me to be an effective researcher, collaborator, mentor, and instructor. I have supervised several undergraduate and graduate research projects which have resulted in publications in top-tier journals. Given a chance, I will be happy to expand the repertoire of the courses in the curriculum of your prestigious institute by offering full & short courses, technical workshops, graduate reading courses on interdisciplinary topics e.g. AI-accelerated development of DNA Biosensors, and special sessions in almost **all courses under the umbrella of Biochemistry, Biotechnology, and DNA Nanotechnology**. Moreover, one of the **specialized interdisciplinary course I can offer is: AI-driven Biochemistry (my detailed course design can be seen here)**. My career goal is to always scavenge for every possibility to serve and improve the field of university-level education.

## 2. Teaching Experience

### 2.1 Sessional/Course Instructor

Course Name	Course Level	Duration	University	Responsibility
AI-accelerated development of DNA-based Biosensors	Graduate-level Reading Course	Winter 2026	Biomedical Engineering, Systems Design Engineering, University of Waterloo, Canada	Course design, Teaching & Grade evaluation.
BIOC410 Nucleic Acid Structure and Function	4 <sup>th</sup> year UG	Fall 2020	Dept. of Chemistry, University of British Columbia, Canada	
PHY 305 Cellular Biophysics (Introduction to Biophysics)	3 <sup>rd</sup> year UG	Winter 2020	Dept. of Computer Science, Mathematics, Physics and Statistics (CMPS), University of British Columbia, Canada	

### 2.2 Teaching Assistant

Course Name	Course Level	Duration	University	Responsibility
NE469 Special Topics in Micro and Nano-Instrumentation	4 <sup>th</sup> year UG	Winter 2017	Waterloo Institute of Nanotechnology, University of Waterloo, Canada	Teaching
Introductory Biochemistry Laboratory	2 <sup>nd</sup> year UG	Winter 2017 Winter 2016	Dept. of Biology, University of Waterloo, Canada	Teaching, Experimental Demonstration, & Grade evaluation.
Chemical Reaction Laboratory	1 <sup>st</sup> year UG	Fall 2017 Fall 2016 Fall 2015 Fall 2014	Dept. of Chemistry, University of Waterloo, Canada	
Chemical Reactions, Equilibria, and kinetics	1 <sup>st</sup> year UG	Winter 2015 Winter 2014	Dept. of Chemistry, University of Waterloo, Canada	Teaching, & Grade evaluation

### 2.3 Guest Lectures /Invited Talks

My passion for student-interaction and domain expertise has driven me to give guest lectures and invited talks at many prestigious universities, and national / international conferences:

Title	Date	Event / Organization
AI x DNA: Redefining How We Sense Life	Apr 2026	FEMverge 2026: AI Edition, inaugural Workshop
‘Introduction to Research & Research Process’	May, 2025	Third Research School on Sustainable Solutions, International Centre for Applied Systems Science for

(Online)		Sustainable Development (ICASSSD), Cambridge, ON, Canada
Functional Nucleic Acids for Sustainable Environment and Healthcare	Mar 22, 2024	Department of Chemistry and Biochemistry, Wilfrid Laurier University, Waterloo, ON, Canada
‘Introduction to Research & Research Process’ (Online)	Mar 27, 2024	Second Research School on Sustainable Solutions, International Centre for Applied Systems Science for Sustainable Development (ICASSSD), Cambridge, ON, Canada
‘Introduction to Research & Research Process’ (Online)	Feb 24, 2023	First Research School on Sustainable Solutions, International Centre for Applied Systems Science for Sustainable Development (ICASSSD), Cambridge, ON, Canada
‘Catalysis and applications of RNA-cleaving DNazymes’	Nov 10, 2019	Quantum & Nano Computing Systems Applications (QANSAS 2019 @50) Conference November 10-12, 2019, Dayalbagh Educational Institute, Agra, India
‘Nanotechnology and DNzyme-based Biosensors’	Oct 30, 2019	Department of Biology and the Department of Chemistry, University of British Columbia, BC, Canada
‘DNA-based Biosensors’	Oct 26, 2018	Department of Biology and the Department of Chemistry, University of British Columbia, BC, Canada
‘DNA-based Biosensors’	Apr 29, 2018	3rd Indo-Canadian Research Colloquium 'UW and DEI: Education and Research in Dialogue', University of Waterloo, Canada
‘Nanotechnology and DNA based Biosensors’	Sept 27, 2017	Department of Biomedical Engineering, University of Waterloo, ON, Canada
‘Can DNA contribute towards green environment?’	Jun 2, 2017	2nd Indo-Canadian Research Colloquium 'UW and DEI: Education and Research in Dialogue', University of Waterloo, Canada
‘DNA and Nanotechnology’ (Online)	Mar 3, 2017	Mount Allison University, Sackville, New Brunswick, Canada
‘DNzyme based Ag <sup>+</sup> Biosensors’	Apr 21, 2016	1st Indo-Canadian Research Colloquium ‘UW and DEI: Education and Research in Dialogue’, University of Waterloo, Canada
‘DNA and Nanotechnology’	Feb 2, 2016	Department of Chemistry, University of Waterloo, ON, Canada
‘Isolation of a DNA sequence that can selectively detect silver ions’	Nov 24, 2015	WIN Graduate Seminar Series, Waterloo Institute of Nanotechnology, University of Waterloo, Waterloo, ON, Canada
‘Regulation, Crosstalk and Mimicry of the Small GTP-binding Proteins’	Jan 31, 2013	State-of-the-Art Seminar Series, Indian Institute of Science Education and Research, Bhopal, MP India

## 2.4 Student Supervision

Student	My role	Research Topic	Duration	Resulting Publication	University
Naren Thambidurai (Masters')	<b>Co-Principal Investigator</b>	AI-accelerated development of a Precision SELEX Library	June 2025 - Present	Manuscript submitted; Ongoing Research	University of Waterloo, ON, Canada
Nikita Gahoi (Postdoc)	<b>Co-Principal Investigator</b>	AI-accelerated Sperm Aptamer Development	Sept 2025- Present	Manuscript submitted; Ongoing Research	
Le Ahn (Postdoc)	Research Advisor as a <b>Collaborator</b>	Hormone detection & remediation in Milk	Sept 2025- Present	Manuscript submitted; Ongoing Research	University of Western Ontario, ON, Canada
Daya Kumar (PhD)	Research Advisor as a <b>Collaborator</b>	AI-guided DNA Aptamer Generation	Jan 2024- Present	On-going Research	
Soniya (Postdoc)	Research Advisor as a <b>Collaborator</b>	AI-guided DNA Aptamer Generation	Jan 2024 - July 2025	Research Article <u>1</u> , <u>2</u>	
Colin Dai (Masters')	Research mentor as a <b>Postdoc</b>	Toward designing highly tunable DNAzyme-based molecular rolling motors.	Sept 2019 – Dec 2020	<u>Master's Thesis</u>	University of British Columbia, BC, Canada
Omkar Kulkarni (Masters')	Research mentor as a <b>Postdoc</b>	DNA based probes to study cellular receptors at a molecular level	Sept 2019 – Dec 2020	Master's Thesis	
Brandon Magnus (UG)	Research mentor as a <b>Postdoc</b>	ELISA-based profiling of mouse-serum samples for identification of early biomarkers for radiation-induced pulmonary fibrosis.	Sept. 2019 – Dec. 2019	Undergraduate 4 <sup>th</sup> Year Research Project Report.	
Mathias Labonte (UG)	Research mentor as a <b>Postdoc</b>	Development of a method for determining fibrotic area in murine lung Samples.	Sept. 2019 – Dec. 2019	Undergraduate 4 <sup>th</sup> Year Research Project Report.	
Sydney Neumeier (UG)	Research mentor as a <b>Postdoc</b>	Electrophoresis-induced shearing and unzipping of double stranded DNA.	May 2019 - August 2019	Undergraduate Research Project Report	

Lide Gu (UG)	Research mentor as a <b>PhD</b>	Reselection based on a silver specific RNACleaving DNAzyme yielding a more active double mutant.	Aug. 2017 – Dec. 2018	<u>Research Article</u>	University of Waterloo, Ontario, Canada
Peter Hoang (UG)	Research mentor as a <b>PhD</b>	Folding of the silver aptamer in Ag10c (Ag <sup>+</sup> dependent RNA cleaving DNAzyme) probed by FRET.	May 2017 – Aug 2017	<u>Research Article</u>	
Austin Jabari (UG)	Research mentor as a <b>PhD</b>	Detecting gold ions using a DNAzyme taking advantage of its extremely strong thiophilicity and complexing with iodide.	May 2017 – Aug 2017	Undergraduate Research Project Report	University of Waterloo, Ontario, Canada
Lu Yao (UG)	Research mentor as a <b>PhD</b>	Folding of the silver aptamer in Ag10c (Ag <sup>+</sup> dependent RNA cleaving DNAzyme) probed by 2- aminopurine fluorescence.	Jan. 2017 – Apr. 2017	<u>Research Article</u>	
Kim Kleinke (UG)	Research mentor as a <b>PhD</b>	Label-Free Ag <sup>+</sup> Detection by Enhancing DNA Sensitized Tb <sup>3+</sup> Luminescence.	Jan. 2016 – Apr. 2016	<u>Research Article</u>	

## 2.5 Voluntary Educational Contribution to Community

I am privileged to be a part of a not-for-profit charitable organization ‘Dayalbagh Radhasoami Satsang Association of North America’ which lays its foundation in the principles of ‘selfless-service’ and ‘Total-quality education’, where I serve as a teacher/mentor for various courses, and have mentored students of a wide age-range starting from 3 years to 80 years. Below are a few examples of those:

Responsibility	Course	Student Profile	Duration	Community
Teaching Volunteer	Hindi Language	Children of age 6-12 yrs.	Spring 2017 Fall 2017	Toronto Branch, Dayalbagh Radhasoami Satsang Association of North America (DRSNA)  [Not-for-profit Charitable Community]
Course Instructor	Block-Printing	Adults of age ranging 60-80 yrs.	Fall 2014 Winter 2015	
Teaching volunteer	Code and Algorithm building using ‘Scratch’	Children of age 6-12 yrs.	Fall 2022 – Present	
Teaching Volunteer	Dramatics / Arts	Children and youth of age 5 – 40 yrs.	Jan 2014- Present	



### 3. Teaching Strategies

There is no doubt about the fact that a teacher's evolution never ends. With the ever-changing attitude and intellect of the students, the aggressively advancing state of the art technology-based teaching methods and the increasing need for simple yet creative and novel solutions to everyday problems, there would always be an undying excitement and scope to innovate one's teaching strategies.

#### 3.1. In the classroom

In my opinion creating an *approachable and inclusive environment* builds a strong foundation for successful learning. With a new group of students, an extra effort is needed to *strike up a friendly and trustworthy rapport*. I do this by means of *various quick writing based or oral activities* e.g. 'one minute paper' or 'pass the mic', etc. In 'one minute paper', each student is given a minute to write on a piece of paper, a few words that describe their specialization, academic interests, and expectations from the course. The papers are collected for review post-lecture. 'Pass the mic' is a more time-consuming activity where each student is given a few seconds to speak up their specialization, interests, and expectations, etc. Both these activities provide me with a great understanding of my target audience.

Another aspect I focus on is *sustenance of students' enthusiasm* in class. To draw students' attention, special emphasis can be laid on the role of the subject or class topic in better understanding of and in solving real-world problems. I *engage the students in such discussions whenever time permits*, it helps to connect with them and keep them interested. I also make it a point to *walk around the class whenever possible and make eye contact with every student at some point during the lecture*, this makes me give individual attention to students even in a classroom environment.

As far as teaching is concerned, I believe that *traditional lecturing* cannot be omitted out of any biology or chemistry class, due to the extensive course content. But, in order to make the traditional lecturing more productive, one must have sound knowledge and confidence regarding the concepts and must try to incorporate *methodical organization, impactful audio-video aids and result oriented interactivity*. The organization of my presentations can be especially highlighted and appreciated by the students when I provide them with generic or specific high-level overviews (e.g. concept maps, flowcharts) of certain ideas or discussion-based problems. I also make sure that my *voice is clear, audible, and coherent and my voice modulations are engaging*.

Apart from traditional lecturing, it is important to engage the students in *game-based learning techniques at equal intervals (e.g. after every 20 min of continuous lecturing) for more impact*. I believe in planning a mix of individual and group activities to be completed before the full course ends. Activities which can be individually played can help the students to learn to think independently (e.g. clickers, kahoot, etc. etc.). Team based activities can inculcate team spirit and expose the students to multitudes of perspectives and teach them to extract and amalgamate the best out of all ideas to come up with an optimum solution.

### 3.2. Beyond the Classroom

I strongly believe in the idea that student-teacher interaction can make multitudes of difference in the way a student perceives the class topics, especially when the interaction goes beyond the class-room settings. Firstly, to make my lectures more effective, easy to follow and streamline students' ideas, I distribute ***thought provoking readings*** prior to the class. This also gives me a platform to probe them with related questions and gauge their level of understanding before starting with the class. Secondly, I strongly feel that giving students individual time for fruitful discussions gives them confidence to speak up and explore unconventional ideas and thus fosters creativity. ***Personal meetings*** also are a great opportunity to give the students constructive feedback in detail. Thirdly, I am a strong supporter of ***encouraging dialogue on online discussion boards***. This activity can be encouraged by awarding participation marks to the students. Lastly, I feel it is a great idea to ***send out interesting subject related videos and fun puzzles for the students to solve outside the classroom setting for maintaining an involved and motivated environment***. An example of an interesting fun puzzle I distributed to the students in a guest lecture for completion after the lecture is shown in **Appendix D**. The students were required to send their solution to me online to receive the correct answer.

### 3.3. Assessments

I strongly believe that in order to maximize student productivity, being able to correctly gauge the students' expectations, level of understanding, clarity of concepts and motivation level of a class as whole is as important as doing the same for students at their individual level. I am a strong supporter of the ideology that ***continuous assessments whether marked or unmarked, provide not only summative, but excellent formative as well as diagnostic opportunities for both the students and the teachers***.

Furthermore, I feel an instructor's responsibility lies not only in assessing the students well but also in preparing them for assessments. Each class begins with a quick lecture review of the previous class, this assists the students in identifying their shortcomings and sometimes even resolving the basic-level issues they have been struggling with. ***I conduct feedback activities like 'True/False', 'muddiest point', 'debates', 'polling', etc.*** in between topics in a lecture, so that I get to analyze where the student's understanding is lacking. These activities may or may not be told to the class beforehand and can be manipulated depending on the time constraints. An example of a diagnostic 'True/False' activity I created to gauge the students' understanding of the topics I taught in a guest lecture is given in **Appendix E**. Here the ***handouts*** containing true/false statements were distributed and collected after 5 min for quick diagnostic feedback.

It is extremely important to design ***a reasonable and fair marking scheme for any course***. I strive hard to make sure that the weightage of marks given to formative/ diagnostic evaluations is well in balance with the summative ones. I believe in framing a variety of questions in which some test the students' ability to precisely state the key points, while the other questions expect detailed explanations. I think it is important ***to incorporate a few questions that judge their ability to link or compare two different concepts, and at least 1 question that challenges their creativity and ability to craft novel ideas***.

## 4. Evaluation of Teaching

***Teaching assessment or student evaluation is a significant part of the never-ending process of being tailored to be a more effective teacher.*** To evaluate my teaching effectiveness, I have sincerely collected student / instructor evaluations for most of the courses I have taught as well as for guest lectures/invited talks. Overall, in my teaching experience, I have been perceived as a very enthusiastic and engaging instructor. I have been especially appreciated for my ability to deliver the content in a very easy to understand manner. Below is a list of the Appendices containing my teaching evaluations:

#### 4.1. Evaluation from Students

Sl. No.	Course/Student Name	Course/Project Level	Teaching Capacity	Organization	Evaluation
1.	CHEM 237L Introductory Biochemistry Laboratory (Anonymous)	Undergraduate (2 <sup>nd</sup> Year)	Lab Teaching Assistant	Dept. of Biol. University of Waterloo, Canada	<b>Appendix A.1</b>
2.	Guest Lecture on ‘Nanotechnology and DNA-based Biosensors’ (Anonymous)	Undergraduate (2 <sup>nd</sup> year)	Guest Lecturer	Dept. of Biomed. Eng., University of Waterloo, Canada	<b>Appendix A.2</b>
3.	e-Seminar on DNA and Nanotechnology (Anonymous)	Undergraduate (2 <sup>nd</sup> – 4 <sup>th</sup> year)	Guest Lecturer	Dept. of Chem, Mount Allison University, Sackville, Canada	<b>Appendix A.3</b>
4.	Colin Dai	Master’s Research	Research Mentor	Dept. of Chem. University of British Columbia, Canada	<b>Appendix A.4</b>
5.	Omkar Kulkarni	Master’s Research	Research Mentor	Dept. of Chem. University of British Columbia, Canada	<b>Appendix A.5</b>
6.	Sydney Neumeier	Undergraduate Research	Research Mentor	Dept. of Chem. University of British Columbia, Canada	<b>Appendix A.6</b>
7.	Sumira Allamraju	Children in Middle School	Volunteer Teacher	Toronto Branch, DRSANA (Charitable Organization)	<b>Appendix A.7</b>
9.	Soham Sassan	Children in Elementary School	Volunteer Teacher	Toronto Branch, DRSANA (Charitable Organization)	<b>Appendix A.8</b>
10.	Gur Pyari Kohly	Retired Adults	Volunteer Teacher	Toronto Branch, DRSANA (Charitable Organization)	<b>Appendix A.9</b>

#### 4.2. Evaluation from Course Instructors

Sl. No.	Course Name	Course Level	Teaching Capacity	Comments / Feedback
1.	CHEM 237L Introductory Biochemistry Laboratory	Undergraduate (2 <sup>nd</sup> Year)	Lab Course Instructor	<b>Appendix B.1</b>
2.	NE469 Special Topics in Micro and Nano-Instrumentation	Undergraduate (4 <sup>th</sup> Year)	Teaching Assistant	<b>Appendix B.2</b>

3.	Guest Lecture on ‘Nanotechnology and DNA based Biosensors’	Undergraduate (2 <sup>nd</sup> year)	Guest Lecturer	<b>Appendix B.3</b>
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#### 4.3. Evaluation from Peers

Sl. No.	Name	Comments / Feedback
1.	Dr. Summer Li (Colleague during postdoctoral research in at the University of British Columbia, Canada)	<b>Appendix C.1</b>
2.	Anonymous Co-learner in the ‘Fundamentals of University Teaching (FUT) Certification - Microteaching session’, University of Waterloo, Canada	<b>Appendix C.2</b>
3.	Anonymous Co-learner in the ‘Fundamentals of University Teaching (FUT) - Microteaching session’, University of Waterloo, Canada	<b>Appendix C.3</b>

#### 4.3 Steps taken for improvement

In my opinion, the process of students’ feedback for the instructor’s teaching skills becomes meaningful only when the instructor takes necessary actions to: a) maintain positive teaching aspects, and b) overcome weaknesses. I value my feedback immensely. In my experience, every single evaluation I have received has impacted my teaching skills in a positive way. There have been multiple instances where I practiced the above. For e.g., when I presented my first invited lecture (WIN Seminar series, UW), I realized the significance of interactive teaching methods. *My audience response was very good for the concepts in which I was interactive, while dull in the ones I was not. My interactivity was not balanced throughout the lecture. To maintain and enhance this aspect, I enrolled myself into the ‘Fundamentals in University Teaching’ Program at UW, to learn in detail about interactive teaching methods and techniques.* I made sure to apply the techniques in my subsequent TAs and invited lectures. In another instance, in one of my TA experiences during my first-year undergraduate studies, *I received feedback asking for improvement of my blackboard writing skills. In my subsequent lectures, I paid especial attention to my clarity of writing on the board. I always divided the board into 4 quadrants and wrote appropriately big letters.* At various instances in subsequent TAs as well as lectures, *I have even conducted a quick feedback survey, asking for feedback on my blackboard writing skills to make sure of my improvement.*

### 5. Professional Development

#### 5.1. Fundamentals of University Teaching

I completed a certification on ‘Fundamentals of University Teaching’ (accredited by Educational Developers Caucus (EDC), Canada), offered by the Center for Teaching Excellence (CTE), at the University of Waterloo (See **Appendix F**). Being a pre-requisite for the ‘Certificate in University Teaching (offered by CTE, UW)’, under this program I have taken part in *6 workshops that focused on detailed aspects of improving teaching and classroom delivery skills, creating effective lesson plans, motivating, and assessing students, giving and receiving feedback, and successful classroom management.* I also delivered *three 15 min micro-teaching sessions to peers where I got an opportunity to plan and execute various active learning techniques*, e.g. 3-D model demonstration, students writing on the board, think-pair-share, asking open-ended questions, etc. For each session, *I received a well thought feedback* that identified aspects of my teaching to maintain and targets for improvement. I also had the privilege of hearing the *much-needed peer feedback* (**Appendix C.2 and C.3**). *Being a part of this program, I learnt the significance and impact of minute things e.g. facial expressions, body gestures, etc., as well as larger concepts such as to create interactive lesson plans, classroom delivery and presentation skills, giving and receiving feedback, etc.*

## 5.2. Certificate in University Teaching

I completed a certification on ‘Certificate in University Teaching (CUT)’, offered by the Center for Teaching Excellence, at the University of Waterloo (See **Appendix G**). Within this program, *I attended four workshops on understanding the learner, interactive teaching, assessing student learning, and course designs*. As a part of each workshop, I have *crafted a 2-page reflective response paper applying the concepts I had learnt*. Being a part of this, *I have been critically observed (by CUT graduate instructional developer) during two in-class teaching sessions (1 hr. each)*. Following each observation, I received *detailed feedback* on my classroom delivery and teaching skills, and these have contributed immensely towards honing my skills (**Appendix B.2 and B.3**). One of *the most interesting aspects of this certification was the requirement of a research paper, for which my topic was ‘Game based learning for university level science courses’*. Through this program, I learnt how to prepare an effective Teaching Dossier, which is an extremely important part of any academic job application. Altogether, this program has proved to be a boon for me to deeply understand as well as enhance teaching strategies.

## 6. Future Goals

I am a firm believer of the fact that the process of maturing into a more receptive as well as effective teacher never ends. With the evolving attitude and intellect of the students, the aggressively advancing state of the art technology-based teaching methods and the increasing need for creative thinking, there would always be scope to learn, experiment and adopt or reject new teaching skill sets.

In terms of my professional development, I intend to continue to communicate effectively with my students and constantly and critically review my teaching methods and habits so that I can benefit from their feedback and thus attempt to be at edge with the latest demands. I aim to regularly attend seminars, conferences, workshops, and activities centered around ‘university teaching’, to learn novel techniques and reinforce the strategies that I have been introduced to, by the CTE at the University of Waterloo.

In terms of teaching and career goals, I intend to establish myself as an academician, mentor, and an effective instructor. I aim to design and teach undergraduate and graduate-level courses in *Analytical and Physical Chemistry, DNA Nanotechnology, and Cheminformatics*. I want to integrate productive Game Based Learning (GBL) in university-level science courses and aim to work towards the same. I am especially interested in designing and executing short courses, workshops, and seminars in various domains of Chemistry for undergraduate science and engineering students.

My goals would always be oriented towards scavenging for each possibility to serve and improve the field of university-level education.

## Appendix A

### Student' Evaluation

**A.1.** Anonymous student evaluation for my role as a TA in the course CHEM 237 Introductory Biochemistry Laboratory, Department of Biology, University of Waterloo, Canada:

Are there some things that you feel were **done especially well** in the teaching of this lab course by your Teaching Assistant? Please comment here.

▼ Collapse Responses

- ▶ Very clear explanations for lab procedures and why we do them.
- ▶ She is always there to help.

**A.2.** Anonymous student evaluation for my role as a Guest Lecturer at the Department of Biomedical Engineering, University of Waterloo, Canada:

Feedback

→ slides were clear and so was your presentation!  
Great lecture, I liked the video part / 3D cragami activity  
Best of luck with your PhD! :)

Feedback

you presented the info in a way that was easy to retain! Thanks for the presentation

Excellent lecture. Complex concepts were presented in a simplified manner  
for students with rudimentary knowledge. Very interesting topic and  
very well presented. Thank you

Feedback

**A.3.** Anonymous student evaluation for my role as a Guest Lecturer at the Department of Chemistry, Mount Allison University, Sackville, Canada:

Strengths of the Presentation:

- Regularly checking in to make sure everyone was on the same page and could understand the material.
- Visual aids were very well explained and enhanced the delivery of the material.
- Very smooth transitions between topics, explaining how each slide ties into the next.

I thought she gave an excellent seminar. She did a great job introducing the subject and giving the necessary background information. Also, she spoke clearly and her voice was engaging. She offered multiple opportunities to ask questions in case we were confused which I liked because if we had not understood something it would not have helped to simply wait until the end to ask. Overall, I thought it was very well done.

**A.4.** Student Evaluation by 'Colin Dai' for my role as a Research Mentor during his Master's Thesis Research:



colindai@student.ubc.ca <colindai@student.ubc... Apr 19, 2023, 9:14 AM (21 hours ago) ★ ↩ ⋮  
to me ▼

Dear Runjhun,

I am thrilled to write an exceptional evaluation for you! In the duration you served as my mentor (for my Master's research work) as well as co-worker at the University of British Columbia, Kelowna, BC, Canada (Sept 2019 - December 2020), you were an invaluable asset to our research team and played an instrumental role in guiding me throughout my graduate studies. Your expertise in Biochemistry and Analytical Chemistry was exceptional, and your willingness to share your knowledge and skills was truly inspiring. I was impressed by your ability to explain complex concepts in a clear and concise manner, which helped me to grasp difficult concepts and allowed me to make good progress in my research. You always provided me with insightful feedback on my work, which helped me to refine my experimental design and interpretation of data.

What set you apart from other mentors was your exceptional attention to detail and scientific rigor. You were meticulous in their experimental planning and execution, and your focus on accuracy and reproducibility was instrumental in ensuring the validity of our findings. Your critical thinking and analytical skills were exceptional, and you consistently challenged me to think critically and develop creative solutions to scientific problems. You were always approachable, friendly, and available to discuss. In summary, I can wholeheartedly recommend you as an outstanding teacher, mentor, and researcher. It was a privilege to work with you, and I feel fortunate to have had the opportunity to learn from such a remarkable mentor.

Thank you for your time and help during my research and career again! I hope you all the best in your future endeavors!

Please don't hesitate to let me know if you need any additional information from my part.

Warm regards,

Colin Dai, MSc

Department of Chemistry, Faculty of Science

The University of British Columbia | Okanagan Campus | Syilx Okanagan Nation Territory

3247 University Way FIPKE 245 | Kelowna, BC | V1V 1V7 | Canada

[colindai@student.ubc.ca](mailto:colindai@student.ubc.ca) | (778)594-1191

#### A.5. Student Evaluation by 'Omkar Kulkarni' for my role as a Research Mentor during his Master's Thesis Research:

omkariit@student.ubc.ca <omkariit@student.ubc... Wed, Apr 19, 9:21 AM (21 hours ago) ★ ↩ ⋮  
to me ▼

Dear Runjhun,

I am pleased to provide an outstanding evaluation for you, who served as my mentor during my tenure as a Masters student in the Li Lab (Sept 2019 - Dec 2020) at The University of British Columbia, Kelowna, BC, Canada.

During my time working with you, I was consistently impressed by your exceptional dedication, commitment, and professionalism towards advancing our research goals. Your deep expertise in DNA Nanotechnology as well as Analytical Chemistry, and keen insights into the intricacies of the research process were invaluable in helping me to navigate the complex experimental procedures required for success in this field. Furthermore, you were always willing to take the time to explain difficult concepts and answer any questions that arose, which greatly facilitated my learning and enabled me to make rapid progress in my work.

Beyond your technical skills, you were also an outstanding mentor in terms of your interpersonal abilities. You created a supportive and collaborative environment within the lab, which fostered a sense of camaraderie and facilitated effective teamwork. Your communication skills were exceptional, and you always made yourself available to discuss any issues or concerns that arose. As a result, I always felt supported and valued as a member of the lab, which greatly enhanced my motivation and commitment to our shared research goals.

Overall, your exceptional technical abilities, dedication, and interpersonal skills made a tremendous impact on my development as a researcher, and I am confident that you will continue to make important contributions to the field in the years ahead.

I was a great learning opportunity to be working under your tutelage. I hope you continue to inspire and mentor many more students to achieve their full potential.

**A.6. Student Evaluation by ‘Sydney Neumeier’ for my role as a Research Mentor during her Undergraduate Research Project:**

**Sydney Neumeier** <sydney.neumeier@mail.utoron... Wed, Apr 19, 9:02 AM (21 hours ago) ★ ↩ ⋮  
to me ▼

Dear Runjhun,

I am honored to write a glowing evaluation for you. You were my co-worker and mentor during my undergraduate research project in the Li lab for four months at the University of British Columbia, Kelowna, BC, Canada.

Working with you was a transformative experience that has had a lasting impact on my scientific career. You possess a remarkable depth of knowledge in the field of DNA Biochemistry, and I learned so much from observing your problem-solving strategies and approach to the scientific method.

As a mentor, you were exceptional in every way. You were always available to answer my questions and provided invaluable feedback on my work. Your constructive criticism was always delivered in a kind and supportive manner, which helped me to grow as a scientist and develop greater confidence in my abilities. You were kind, compassionate, and always had a positive attitude. You went out of their way to support me and my fellow lab members. I wholeheartedly endorse you as an outstanding mentor and scientist.

Wishing you all the best,

**Sydney Neumeier (she/her)**  
*MD Candidate 2025*  
*University of Toronto, Temerty Faculty of Medicine*

**A.7. Student Evaluation by ‘Ashita Allamraju’ for my role as a Volunteer Teacher in ‘Dramatics/Arts’ classes hosted for Middle School children by Charitable Organization DRSANA (Toronto Branch):**

**Sumira Allamraju** <sumira.allamraju@gmail.com> Wed, Apr 19, 11:11AM (19 hours ago) ★ ↩ ⋮  
to me, Ashita ▼

Dear Runjhun,

This email is to thank you for being an amazing Dramatics/Arts teacher over the past two years. Your passion for the subject is contagious, and you always manage to make the class fun and exciting. I have learned so much from you, not just about dramatics, but about myself as well. You have helped me build my confidence, improve my communication skills, and develop my creativity. You always encouraged me to push myself and take reasonable risks, and I am grateful for that. I appreciate how you always gave constructive feedback that helped me improve. Thank you for creating such a positive and supportive environment where I felt comfortable expressing myself and trying new things.

Sumira Allamraju  
Grade 8  
Lisgar Middle School



**A.8. Student Evaluation by ‘Soham Sasan’ for my role as a Volunteer Teacher in ‘Hindi Language’ classes hosted for Elementary School children by Charitable Organization DRSANA (Toronto Branch):**

**Soham Sasan**

Wed, Apr 19, 5:10 PM (13 hours ago)



to me ▾

Dear Runjhun,

I hope this message finds you well. This is a note to thank you for being such an amazing Hindi language teacher. Even though it has been six years since I was in your class, the impact you had on my language learning has stayed with me. I remember how much I enjoyed your class and how you always made learning Hindi fun, engaging, and entertaining.

I also appreciated how you made an effort to connect with each of your students and made sure we felt included and valued in the class. Your passion for the language was evident, and this inspired me to work harder and to become better at Hindi. Thanks to you, I still have a love for Hindi and the language learning process. I know that I will continue to use and appreciate what I learned in your class for years to come.

Sincerely,

Soham Sasan

Student, Grade 11, Brampton Christian School

**A.9. Student Evaluation by ‘Gur Pyari Kohly’ for my role as a Volunteer Teacher in ‘Block-Printing’ hobby classes hosted for Retired Professionals by Charitable Organization DRSANA (Toronto Branch):**

**Gur Pyari Kohly**

Wed, Apr 19, 11:52 AM (19 hours ago)



to me ▾

Dear Runjhun

Here is a token of appreciation for you, for being a great block printing course mentor. Although it has been several years since I took your class, I often think back to the time I spent learning from you.

As a 73-year-old student, I was initially hesitant to take up block printing, but your warm and encouraging personality put me at ease from the very beginning. Your passion for the art of block printing was infectious, and your expertise and guidance helped me create beautiful prints that I never thought possible. Your individualized attention and feedback helped me improve my skills and gave me the confidence to keep creating.

I also appreciated how you fostered a sense of community among the students, which made the experience even more enjoyable. As a young teacher, your ability to connect with and inspire students of all ages is truly remarkable. The memories of our time in class and the prints I created under your guidance will always hold a special place in my heart.

Sincerely,

Gur Pyari Kohly

Business Analyst (Retired Ontario Government Employee) |

M. A. In Education from University of Ontario |

M.A. in Psychology from St. John's College, Agra University |

B. A. From W. T. C, Dayalbagh Educational Institute.

## Appendix B

### Instructor Evaluation

**B.1.** Instructor evaluation for my role as a Teaching Assistant in the course 'CHEM 237 Introductory Biochemistry Laboratory', Department of Biology, University of Waterloo, Canada:



FACULTY OF SCIENCE | Department of Chemistry  
519-888-4567 | fax 519-746-0435  
uwaterloo.ca/chemistry

May 14, 2018

To whomever it may concern:

I have known Runjhun Saran for more than two years. She has worked as a teaching assistant (TA) under my supervision for an introductory biochemistry lab course at the University of Waterloo (CHEM 237L - Introductory Biochemistry Laboratory) during two terms, 'Winter 2016' and 'Winter 2017'. Her duties included grading lab reports, demonstrating lab techniques and providing both practical and theoretical help as the students executed their experiments. Runjhun was an excellent TA.

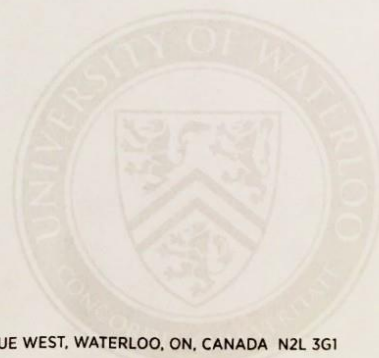
Runjhun was very approachable and always ready to solve problems and help with the various questions she was asked by her students. She was always excited about the biochemistry material, and possessed sound knowledge regarding the concepts being studied or demonstrated in the lab. Her enthusiasm for facilitating the experiments was contagious and made the concepts even more interesting to learn for the students. Additionally, Runjhun was very organized, responsible and made sure every laboratory session went smoothly. She was very consistent with feedback and frequently went above and beyond her call when grading to provide helpful advice to her students for improvement.

As a TA, Runjhun worked with other graduate student TAs. She developed a good working relationship with all her colleagues and was a valued team member. Her contributions during both her TA assignments benefitted the lab course which led to very successful terms.

Sincerely,

A handwritten signature in black ink, appearing to read "Laura Marrone".

Laura Marrone, PhD  
Department of Chemistry  
University of Waterloo  
Waterloo, Canada  
lmarrone@uwaterloo.ca



200 UNIVERSITY AVENUE WEST, WATERLOO, ON, CANADA N2L 3G1



**B.2.** Instructor evaluation from the Centre for Teaching Excellence, University of Waterloo, Canada, for one the lectures in the course ‘Special topics in Micro & Nano Instrumentation (NE 469)’, Waterloo Institute of Nanotechnology, University of Waterloo, Canada:

### **Observation Report #1** **Runjhun Saran – Chemistry**

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<b>Event Observed:</b>	Special Topics in Micro & Nano Instrumentation (NE 469)
<b>Date Observed:</b>	March 3, 2017
<b>Location:</b>	QNC, 2502
<b>Time:</b>	10-11:20 am
<b>Number of Students Present:</b>	16
<b>Observer:</b>	Laura Williams, Graduate Instructional Developer, University of Waterloo Centre for Teaching Excellence

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#### **Plan for Teaching Event:**

This teaching event occurred in a 4<sup>th</sup> year course for students in the Nano-Engineering program. This is an elective course that also has a pre-requisite required for student enrollment. You delivered a guest lecture for this course regarding the topics of Aptamers for Drug Screening and Immobilized Biosensors. You planned to use lecturing, question strategies, and a modified Think-Pair-Share activity with a handout you designed with ~15 True/False questions as teaching methods. Your specific learning outcomes were:

- 1) Describe the general process of drug screening and development
- 2) Describe the process of High Throughput Screening
- 3) Differentiate between traditional and high throughput drug screening
- 4) Identify & evaluate advantages/disadvantages of HTS screening over traditional methods
- 5) Appreciate the potential of aptamers, and how they are applied in drug screening
- 6) Describe the various methodologies in which aptamers are used to screen drugs

You specifically asked for feedback on: 1) time management and pace of teaching, 2) facial expressions, 3) communication of intended learning outcomes and 4) clarity of explanations & writing on the white board.

---

#### **Aspects to Maintain:**

##### **1. Voice Pacing and Volume**

- Runjhun, you had excellent voice projection while teaching. You spoke clearly and enunciated words, which is important when students are being presented with scientific terminology/jargon. You spoke at an accessible pace and you added pauses to your speaking where appropriate, ensuring students had a chance to catch up on making notes.
- You had great enthusiasm in your voice while teaching; you were interested in the topic and therefore wanted your audience to be interested as well. You also added humor to your teaching to keep students engaged. Examples:
  - “It takes 13 years to make a drug – that is a *long* time. It is not easy”. When discussing traditional assays with HTS Assays - “Humans make mistakes, we only have so much brain power, we get tired, and we are only going to do as much as we get paid for. Machines, don’t have this problem.”

This confidential report is based on an observation of a single teaching event, and is intended for the personal use of Runjhun Saran in support of her teaching activities.



## **2. Facial Expressions**

- Runjhun, you specifically asked for feedback regarding facial expressions. You do make a variety of facial expressions which match your tone of excitement and enthusiasm for the material. You smile often while teaching which makes you appear happy to be there, and approachable. One specific example is from when you were talking about Nano particles, and you said “do we know what they are? Yeah, we have talked about them before, and they are really small. Like 10,000 x smaller than the diameter of a human hair!” You then made a facial expression of surprise / shock to help demonstrate the impact of the material.

## **3. Activity Facilitation**

- Runjhun, I applaud you for your effective facilitation of your in class activity! Firstly, I like that you explained to the students why you gave them the T/F question handout at the beginning of class, even though they weren’t going to interact with it until the end. You gave students the opportunity to read through the questions at the beginning so that they would know what aspects of the lesson were going to be important.
- You also gave students specific instructions when facilitating the activity, and you made sure that all students had completed the T/F questionnaire before collecting them. When realizing that you had time remaining in class, you read the questions aloud and prompted answers from the entire class (students being without their sheets & answers). The entire class seemed to enjoy this activity and mini-quiz!

## **Targets for Change and Methods for Improvement:**

### **1. Recognizing Opportunities for Interaction with Students**

- This 80 minute lecture contained a 5 min break approximately half way through the class (something that the course professor does on a regular basis). During this 5 minute break, you mostly stood behind the podium, waiting to resume the lesson. This short little break time is an excellent chance for you to walk around and chat with the students in the class especially since it is a small class of N=16. If this were your own course and you did this throughout a semester, you would have the opportunity to chat with all of the students in the course and get to know them on a personal level.
- Again, when students were doing the activity at the end of the lecture, you remained at the front of the room. I suggest that in the future, you move around to check in on what students are doing, pose questions and clarify information when necessary.

### **2. Use of “Filler Words”**

- Overall, your presentation and delivery skills were very strong! However, I noticed that you frequently used filler words, such as “um” and “so” throughout the body of your lecture. You specifically use the word “so” when changing slides, or when changing thoughts/topics within a specific slide. Using these types of words can become distracting to your students. As such, I would suggest that you work on eliminating such words from your teaching.

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### 3. Confidence when Giving Instructions

- Runjhun, while the facilitation of your activity was excellent, there is one thing that I do wish to point out, and that is the manner in which you give students instructions. Sometimes, you tended to form them as a question to your students. Examples:
  - You gave specific instructions about the break “We’ll take a 5 minute break. It is 10:36 so we will start again at 10:41.” When it was time to start the lesson again you said “it is 10:41, so should we get started?”
  - During the activity at the end of class you said to a student “do you want to go and find a partner?”
- This can make you appear less confident, or not in control of the classroom. For these specific scenarios, don’t ask students what you want them to do – TELL them!

#### Additional Comments:

I really enjoyed your enthusiasm throughout this lesson! You showed appreciation for student participation by thanking them for their responses when answering questions.

You had asked about feedback regarding movement while teaching. You move around the front of the room well, and spend little time behind the podium making you accessible to students. You do tend to turn your body slightly away from the class and speak to the slides/screen. This is something that you can focus on for future teaching.

Good luck with your second observation!

**Decision: Accepted**

#### Response Paper

**Due: Monday March 20, 2017** (email to [l4willia@uwaterloo.ca](mailto:l4willia@uwaterloo.ca) (lower case “L”))

**Prompt:** For your response paper (2 pages single-spaced), I would like you to reflect on the following questions:

- 1) This is a large classroom for such a small class size. If you were teaching this course as a sessional, what other interactive teaching methods would you use to engage students in learning and make use of such space?
- 2) If you had the opportunity to go back and teach this lecture again, what would you do differently and why? Consider my comments under the *Targets for Change and Methods for Improvement* heading of this observation report and discuss ways in which you can improve in each of these areas of your teaching.

**This confidential report is based on an observation of a single teaching event, and is intended for the personal use of Runjhun Saran in support of her teaching activities.**



**B.3.** Instructor evaluation from the Centre for Teaching Excellence, University of Waterloo, Canada, for a guest lecture delivered on ‘Nanotechnology and DNA-based Biosensors’ in the Department of Biomedical Engineering, University of Waterloo, Canada:

**Observation Report #2**  
**Runjhun Saran – Chemistry department**

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<b>Event Observed:</b>	Class Prof-hour for 2A biomedical engineering students
<b>Date Observed:</b>	September 27, 2017
<b>Location:</b>	RCH 308
<b>Time:</b>	10:30am-11:20am
<b>Number of Students Present:</b>	35
<b>Observer:</b>	Jhotisha Mugon, Graduate Instructional Developer, University of Waterloo Centre for Teaching Excellence

---

**Plan for Teaching Event:** topic: Nanotechnology and DNA based biosensors

This teaching event occurred during class Prof-hour for 2A biomedical engineering students. Class-prof hour are sessions where 2A biomedical engineering students can get exposure about what kind of research is being conducted in their field as well as ideas on what students can do with their degree. Attendance is optional for students. You are guest lecturing in this class prof-hour session. This specific session covered the topics of Nanotechnology and DNA based biosensors. You planned to use lecturing, question strategies, a modified think-pair-share with a handout, and ~10 True/False questions as teaching methods. Your specific learning outcomes were students will be able to:

1. Understand and appreciate that apart from the conventional biological functions of DNA, it is now known to have new chemical functions.
2. Remember that three main new functions of DNA are: assembly of materials, molecular recognition and catalysis.
3. Appreciate the potential of these new functions in the development of Biosensors.

Your learning outcomes were based on the fact that your learners would not be tested on the material covered during your lesson. Rather, your lesson is meant to expose them to new information which they might find interesting. You specifically asked for feedback regarding: Time management and pace of teaching, rapport between instructor and students, clarity of explanations / confidence while giving instructions and use of ‘filler words’.

---

**Aspects to Maintain:**

**1. Professionalism**

- Being a guest lecturer can be daunting as students do not know you and you do not know how they will react to your presence. This did not appear to be an issue for you because you established your credibility and professionalism immediately.
- I appreciate you taking the time to introduce yourself and your lab to the group, as these students didn’t know you. You also clearly established that you are very knowledgeable in the material and demonstrated a lot of enthusiasm for the material.
- Runjhun, you also demonstrated to students that you are highly approachable. You did this through your willingness to answer student questions, and when you circulated throughout the room during your teaching activities.

This confidential report is based on an observation of a single teaching event, and is intended for the personal use of Runjhun Saran in support of her teaching activities.



## **2. Presentation skills:**

- You spoke very comfortably and used very few filler words. It was great to see that you successfully worked on feedback from your previous observation and removed filler words in your presentation- Well done! You also used a variety of vocal intonations which helped keep the students' attention and made the lecture seem more interesting. These changes in vocal tone also made you seem interested and excited about your topic. This enthusiastic approach to the lecture was something that you wanted me to focus on during your teaching event and I think you did really well – good job!
- Given that students in this class had various interests, I was really impressed to see that you provided a great overview of what you will cover in this class and worked to include a variety of examples to help make the material relevant for each and every student. Using examples of how cocaine binds to DNA and how biosensors can be used to detect the presence of cocaine as well as other chemicals in blood, water and other substances, you maintained learners' engagement throughout the lesson. Furthermore, by highlighting the real life applications of nanotechnology, you ensured that your students could identify in some way with the material that you presented.

## **3. Interactivity**

- You also did an excellent job of integrating questions and other opportunities for interaction (DNA origami, video) into your guest lecture. Some of your questions encouraged class participation and discussion. For example, you asked "What's the biological function of DNA?" and "why is it called a biosensor?" I was really happy that you consistently followed up a student's response to your questions with an affirming remark, like, "yes, very good..." or "That's correct", to further encourage that student to keep offering responses and also to encourage more shy students to get involved in the exchange. The mixture of lecturing and interactive activities allowed you to establish an excellent rapport between yourself as the instructor and the students- well done!
- Overall I felt that the activities that you planned were extremely well executed. You gave students clear instructions about what they were to do within their small groups, you set up the goals of the activity and you also let the students know how much time they would have to complete the steps. You also made yourself available to your students while they were working which kept the lines of communication open so that students could ask you questions as they encountered problems. While the students were doing the activity you checked in on their progress and stated how much time they would have to finish up. Doing this made sure that students could plan their time and they wouldn't be caught off guard when the activity concluded. You conducted this activity as we would at CTE, well done!

**This confidential report is based on an observation of a single teaching event, and is intended for the personal use of Runjhun Saran in support of her teaching activities.**



## **Targets for Change and Methods for Improvement:**

### **1. Questioning strategies**

- Runjhun, while I applaud you for asking your audience a lot of question and trying to generate engagement from your audience, I noticed that as the lesson progressed, your questions changed from open-ended to close-ended. For example, you asked "Does anybody have any idea of what self-assemble is?" As you move forward in your teaching career, I encourage you to pay close attention to your questioning strategies and try to make more of your questions (polling aside) open-ended. This will help generate more engagement in your learners. I would also encourage you to use pauses together with your questioning strategies. During your lesson you asked the questions "why is it called a biosensor?" and then proceeded to provide students the answer. I encourage you to pause for 5-7 seconds after asking a question to give learners some time to gather their thoughts and think of an answer
- Prior to covering the material on biosensor, you checked in with students to ensure that everyone understood the material. You asked "Is everyone with me? Is everyone following? Have I confused you anywhere?" Here again, I would encourage you to use open ended questions and pauses to probe students understanding. Furthermore, I would also encourage you to carry out comprehension checks more often in your lessons- especially when introducing a new concept or technique.

### **2. Presentation delivery:**

- Runjhun, you wanted specific feedback on the pace of the lesson. As I mentioned above (in the questioning strategies section), it would have been great if students had some time to think of answers when they were asked questions. Responding quickly to your own questions lead to the lesson being a little bit fast paced. Furthermore, towards the end of the lesson, your pace picked up as you realized that there were only 10 minutes left till the end. I would suggest that in future teaching events you make a habit of asking the students if they are following or if they are falling behind (note this is different from comprehension checks). This is especially important when teaching students new concepts such as the functions of DNA. If your pace is too fast and some students fall behind it is impossible for those students to learn from what you are teaching. If you find that students are tending to fall behind in your lecture I would suggest that you try to inject a few more pauses in your lectures. These short periods of silence can be a HUGE advantage for your students as they would be given the chance to "catch-up". These periods of silence will probably feel like a life time to you but to your students it will be a welcome break for some extra note-taking or thoughtful reflection on the material that you have just presented.
- Runjhun, your presentation skills were very strong. However, one thing that I would like to draw your attention to is in regards to referring to slides. During your teaching event, you had a podium in the middle of the class and two projector screens on either side of the podium. For the first half of the lesson, you used the left screen (student's left) to point and explain diagrams. For the last 15 minutes of the lesson, you mainly used the right screen to go over the content. This might have resulted in some students feeling left

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out. If you find yourself in a similar teaching setting in the future, I would encourage you to pay equal attention to both screens so as to prevent students from feeling left out.

### **3. Classroom management**

- Towards the end of the DNA origami activity, students were talking among themselves. You did a great job in re-focusing their attention. However, I noticed was that there were two small groups of students at the back of the classroom that engaged in conversations among themselves for a good part of your lesson. This discussion acted as a distraction for the other students in the room and it also kept them from becoming involved in the tutorial. In the future, I would encourage you to try to engage these specific students in the tutorial to keep them from disrupting the class for the others. One way in which you could do this is to ask questions directly to that part of the room. Another option would be to use pauses and let your students know that you will resume talking once there is silence in the classroom.

### **Additional Comments:**

Thank you for having me in this lesson for your teaching event, Runjhun! It was absolutely a genuine pleasure to observe your teaching. I especially liked the manner in which you ended the lesson with a post-assessment and a summary. You imbued humour in the post-assessment and had an excellent positive reaction from your audience. This was a fantastic way to end your lesson. I wish you nothing but the best in all your future teaching endeavours.

### **Decision: Accepted**

### **Response Paper**

**Due: Monday 16<sup>th</sup> October, 2017** – Please email to [jmugon@uwaterloo.ca](mailto:jmugon@uwaterloo.ca)

### **Prompt:**

For your response paper (2 pages single-spaced), I would like you to discuss your progression as a teacher since you started the Certificate in University Teaching.

- What surprising things have you learned through the observation process?
- What elements of your teaching have you tried to improve and what methods have worked/not worked in accomplishing these goals?
- Will you continue as a teacher? If so, what draws you to teaching? If you continue as a teacher, what elements of your teaching will you continue to work to improve over your next teaching opportunities?

**This confidential report is based on an observation of a single teaching event, and is intended for the personal use of Runjhun Saran in support of her teaching activities.**

## Appendix C

### Peer Evaluation

#### C.1. Evaluation by Dr. Summer Li (Colleague during postdoctoral research at the University of British Columbia, Canada)

Summer Li

1:01PM (56 minutes ago)



to me ▾

Dear Runjhun,

As your co-worker at The University of British Columbia Okanagan, this letter is intended to serve as a peer evaluation of your mentorship of the graduate students in the Li lab at UBCO from September 2019 to December 2020,

After seeing your group presentations and your participation in the 2019 Western Canada Biophysics conference, I've noticed that you are a good presenter. You use clear language, lay out the arguments logically and most importantly, demonstrate great enthusiasm for science.

In addition, you have shown to be a hands-on educator and an effective communicator. When interacting with the graduate students (for example Colin Dai and Omkar Kulkarni), you are invested in their learning and success. You are able to connect with the students and support their learning through clear instruction and patience.

Finally, you've strived to create a welcoming and inclusive lab environment. You fostered a sense of community and are always excited to establish collaborations among students and colleagues. You are never reluctant to share your expertise and are encouraging when the students are facing hardships.

It has been a pleasure to witness your dedication, expertise as a mentor in the Li lab.

Sincerely,

Summer Xia Li, PhD

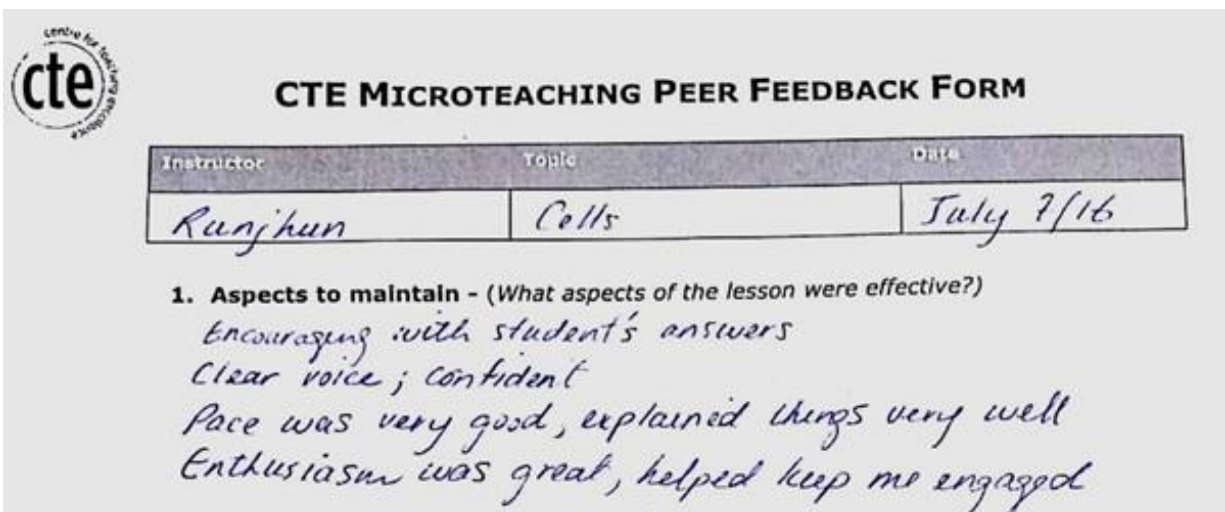
Lecturer

Irving K. Barber School of Arts and Sciences | Chemistry

The University of British Columbia | Okanagan Campus

SCI233A

#### C.2. Anonymous evaluation by a co-learner in the 'Fundamentals of University Teaching (FUT) Certification - Microteaching session', Centre for Teaching Excellence, University of Waterloo, Canada




The image shows a 'CTE Microteaching Peer Feedback Form' from the Centre for Teaching Excellence (cte). The form includes a table with columns for Instructor, Topic, and Date. The handwritten entries are: Instructor: Runjhun, Topic: Cells, Date: July 7/16. Below the table, there is a section for feedback with the heading '1. Aspects to maintain - (What aspects of the lesson were effective?)'. The handwritten feedback includes: 'Encouraging with student's answers', 'Clear voice; confident', 'Pace was very good, explained things very well', and 'Enthusiasm was great, helped keep me engaged'.

Instructor	Topic	Date
Runjhun	Cells	July 7/16

**1. Aspects to maintain - (What aspects of the lesson were effective?)**

Encouraging with student's answers  
Clear voice; confident  
Pace was very good, explained things very well  
Enthusiasm was great, helped keep me engaged

**C.3. Anonymous evaluation by a co-learner in the 'Fundamentals of University Teaching (FUT) Certification - Microteaching session', Centre for Teaching Excellence, University of Waterloo, Canada**

 **CTE MICROTEACHING PEER FEEDBACK**

Microteaching Session Instructor	Topic	Date
Runthun	GBL	4 Aug 2016

- Aspects to celebrate** (What aspects of the lesson were effective and would you like to see maintained?)  
 Enthusiastic and engaging presenter  
 We were engaged throughout and riveted to your lesson.
- Opportunities for development** (What changes do you think would make future lessons more effective?)  
 time got away but audience wanted more!
- Interactivity** (How were the learners involved in the lesson? What was effective about these activities and what could be changed in the future?)  
 Well designed to demonstrate positive experience for learners with GBL. Bravo! Thoroughly enjoyable learning experience. Thank you for the handouts.

## Appendix D

An interesting and fun puzzle was distributed to students to increase engagement and motivation beyond the classroom. The students were asked to post their solutions online and the correct answer was posted to them in response!

**DNA Origami Puzzle (Send your solution to me by email and I'll email you back the correct answer!)**

AAAAAAAAAAAAATCTCTCTCTCTGGGGGGGGGGGGGG

AGAGAGAGAGAGA

TTTTTTTTTTTTTTACTGCCCCCCCCCCCCCCC

**Above are three DNA sequences. Guess what 2-D structure they will form upon hybridizing together?**

**Rules: A base pairs with T**

**C base pairs with G.**

**None of the three DNA sequences forms base pairs within itself.**

My email ID: [rasaran@uwaterloo.ca](mailto:rasaran@uwaterloo.ca)

**Answer:**

AGAGAGAGAGAGA

TCTCTCTCTCT

A standard 1D barcode is located at the bottom of the page, consisting of vertical black bars of varying widths.



## Appendix E

A quick true/false activity prepared for assessment of the understanding of the topic taught. The handouts containing true/false statements were distributed, the students were given 5 min to write T/F in front of the statement and the handouts were quickly collected for a quick diagnostic feedback!

**Name:**

**Class:**

**Date:**

**Diagnostic feedback activity - True/False (No marks allotted) :**

**Time: 5 min**

DNA has a backbone containing Sulphur.....

Once denatured, a double helix cannot be renatured.....

Aptamers are nucleic acid based binding molecules.....

3-D structures cannot be formed using DNA origami.....

DNA can act as a catalyst.....

Gold nanoparticles change color upon aggregation.....

DNA can be biologically and but not chemically synthesized.....

Gold nanoparticles and hydrogels cannot be attached with DNA.....

Nucleic acids can be used to build selective and specific biosensors.....

There is no difference between Aptamers and DNAzymes.....

## Appendix F

### The Fundamentals of University Teaching Certificate!



This is to certify that

*Runjhun Saran*

has successfully completed

### FUNDAMENTALS OF UNIVERSITY TEACHING PROGRAM

by attending six workshops on university teaching  
and participating in three microteaching sessions

**August 2016**

A handwritten signature in black ink, appearing to be "Donna", written over a horizontal line.

Donna Ellis, PhD  
Director



A handwritten signature in black ink, appearing to be "Svitlana", written over a horizontal line.

Svitlana Taraban-Gordon, PhD  
Senior Instructional Developer  
Centre for Teaching Excellence

## Appendix G

The Certificate of University Teaching!

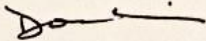
# University of Waterloo

*The Senate confirms that*

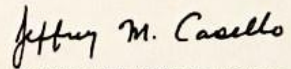
**Runjhun Saran Narayan**

*has fulfilled the requirements for the*

**Certificate in University Teaching**



DIRECTOR, CENTRE FOR TEACHING EXCELLENCE



ASSOCIATE VICE-PRESIDENT, GRADUATE  
STUDIES AND POST-DOCTORAL AFFAIRS

THIS SEVENTH DAY OF JANUARY  
TWO THOUSAND AND NINETEEN