

RUNJHUN SARAN NARAYAN

AFFILIATE ASSOCIATE RESEARCHER

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HIGHLIGHTS

- Highly skilled researcher in Biochemistry, Biotechnology, DNA Nanotech, and applied Artificial Intelligence.
- Eager to leverage my diverse skill-set to push the boundaries of state-of-the-art robust innovations in the field of Biotherapy, Bio-diagnostics, Environmental monitoring, and applied Machine Learning.
- >10 years of extensive research experience, published 17+ high impact research articles: [Google Scholar](#).
- Actively pursuing & publishing independent as well as collaborative multidisciplinary research projects.
- Certified in Machine Learning, Python, R, and SQL.
- Strong experience of undergraduate (UG) and graduate research mentorship. Interacted with more than 1200 UG students as a Teaching Assistant, and as a Course Instructor

TECHNICAL SKILLS AND CERTIFICATIONS

Biochemistry	DNA Nanotechnology	Bioanalytical chemistry	Python (Certified)
Biotechnology	University Teaching (Certified 1 , 2)	Cheminformatics	SQL (Certified)
Biosensors	Machine Learning (Certified 1 , 2)	Scientific Writing	Tableau (Certified)

EDUCATION

Doctor of Philosophy (Nanotechnology) University of Waterloo, Waterloo, Ontario, Canada Biochemistry Biotechnology Bio-analytical Chemistry DNA Nanotech Biosensors Scientific Writing	2014 – 2019
Master's of Technology (Biotechnology) Anna University, Chennai, India Biotechnology Biochemistry Molecular Biology Microbiology Scientific Writing	2009 – 2011
Bachelor's of Technology (Biotechnology) Amity University, Noida, India Biotechnology	2005 – 2009

WORK EXPERIENCE

Affiliate Research Associate International Center for Applied Systems Science for Sustainable Development, Cambridge, ON Canada Biochemistry Biotechnology Cheminformatics applied Machine Learning Scientific Writing	Jan 2023 – Present
Parental Career Break	May 2020 – Dec 2022
Postdoctoral Researcher, Department of Chemistry Sessional Instructor, Department of Chemistry Scientific Coordinator, Medical Physics and Data Analytics Cluster The University of British Columbia, Kelowna, British Columbia, Canada Biochemistry Biotechnology DNA Nanotech Scientific Writing Research Mentor University Teaching Project Management	Sept 2019 – Apr 2020
Research Assistant University of Waterloo, Waterloo, Ontario, Canada DNA Nanotechnology Biochemistry Biosensors Analytical Chemistry Scientific Writing	Feb 2014 – Jul 2014
Research Fellow (CSIR / GATE) Indian Institute of Science Education and Research Bhopal, M.P., India Biochemistry Molecular Biology Microbiology Data Analysis Scientific Writing	Jun 2011 – Dec 2013

PUBLICATIONS

Research Articles – Machine Learning | Nucleic Acids :

1. Chharia A., **Saran R.** and Narayan A.; [IEEE International Joint Conference on Neural Networks 2023](#), Gold Coast, Australia 18–23; June 2023 | cAPTured: Neural Reflex Arc-Inspired Fuzzy Continual Learning for Capturing in Silico Aptamer–Target Protein Interactions (Accepted).
2. Javier P T., Po–Jung J H., Yuzhe D., **Narayan R S.**, Narayan A. and Juewen L.; ACS Synthetic Biology; Jan 3, 2023 | [Machine Learning Directed Aptamer Search from Conserved Primary Sequences and Secondary Structures.](#)

Research Articles – DNA Nanotechnology | Biochemistry | Biosensors | Analytical Chemistry :

1. **Saran R.**, Piccolo K. A., He Y., Kang Y., Huang P. J. J., Wei C., Chen D., Dieckmann T. and Liu J.; Canadian Journal of Chemistry 99 (11), 860–866; Sep 16, 2021 | [Thioflavin T fluorescence and NMR spectroscopy suggesting a non-G-quadruplex structure for a sodium binding aptamer embedded in DNazymes.](#)
2. Gu L., **Saran R.**, Yan W., Huang P J J., Wang S., Lyu M., Liu J.; ACS omega 3 (11), 15174–15181; Nov 9, 2018 · [Reselection Yielding a Smaller and More Active Silver–Specific DNazyme.](#)
3. **Saran R.**, Lu Y., Hoang P. and Liu J.; Biochimie 145, 145–150; Jul 12, 2017 | [Folding of the silver aptamer in a DNazyme probed by 2-aminopurine fluorescence.](#)
4. Zhou W., **Saran R.**, Ding J., Liu J.; ChemBioChem 18 (18), 1828–1835; Jun 28, 2017 | [Two Completely Different Mechanisms for Highly Specific Na⁺ Recognition by DNazymes.](#)
5. **Saran R.**, Kleinke K., Zhou W., Yu T. and Liu J.; Biochemistry 56 (14), 1955–1962; Mar 27, 2017 | [A Silver–Specific DNazyme with a New Silver Aptamer and Salt–Promoted Activity.](#)
6. Zhou W., **Saran R.**, Huang P J J., Ding J., Liu J.; ChemBioChem 18 (6), 518–522; Jan 14, 2017 | [An Exceptionally Selective DNA Cooperatively Binding Two Ca²⁺ Ions.](#)
7. Kleinke K., **Saran R.**, Liu J.; Sensors 16 (9), 1370; Aug 26, 2016 | [Label-Free Ag⁺ Detection by Enhancing DNA Sensitized Tb³⁺ Luminescence.](#)
8. Chandra M., **Saran R.**, Datta S.; Biochemical and biophysical research communications 473 (1), 8–16; Apr 22, 2016 | [Deciphering the role of Atg5 in nucleotide dependent interaction of Rab33B with the dimeric complex, Atg5–Atg16L1.](#)
9. **Saran R.**, Liu J.; Analytical Chemistry 88 (7), 4014–4020; Mar 15, 2016 | [A Silver DNazyme.](#)
10. **Saran R.**, Liu J.; Inorganic Chemistry Frontiers 3 (4), 494–501; Jan 11th, 2016 | [A comparison of two classic Pb²⁺–dependent RNA–cleaving DNazymes.](#)
11. Zhou W., **Saran R.**, Chen Q., Ding J., Liu J.; ChemBioChem 17 (2), 159–163; Nov 19th, 2015 | [A New Na⁺–Dependent RNA–Cleaving DNazyme with over 1000–fold Rate Acceleration by Ethanol.](#)
12. **Saran R.**, Chen Q., Liu J.; Journal of molecular evolution 81, 235–244; Oct 12, 2015 | [Searching for a DNazyme Version of the Leadzyme.](#)
13. Wang F., **Saran R.**, Liu J.; Bioorganic & medicinal chemistry letters 25 (7), 1460–1463; Apr 1, 2015 | [Tandem DNazymes for mRNA cleavage: Choice of enzyme, metal ions and the antisense effect.](#)

Reviews – DNA Biophysics | DNA Chemistry | DNA Nanotechnology :

1. **Saran R.**, Huang Z. and Liu J.; Coordination Chemistry Reviews 428, 213624 · Feb 1, 2021 | [Phosphorothioate nucleic acids for probing metal binding, biosensing and nanotechnology.](#)
2. **Saran R.**, Wang Y. and Li I. T. S.; Sensors 2020, 20 (24), 7019 · Dec 29, 2020 | [Mechanical Flexibility of DNA: A Quintessential Tool for DNA Nanotechnology.](#)
3. Zhou W., **Saran R.** and Liu J.; Chemical Reviews 117 (12), 8272–8325 · Jun 9, 2017 | [Metal Sensing by DNA.](#)

STUDENT SUPERVISION

Student Name	Project Level	Research Topic	Duration	Resulting Publication	University
Colin Dai	Master's	Toward designing highly tunable DNazyme-based molecular rolling motors.	Sept 2019 – Dec 2020	Master's Thesis	University of British Columbia, BC, CN

Omkar Kulkarni	Master's	DNA based probes to study cellular receptors at a molecular level	Sept 2019 – Dec 2020	Master's Thesis	University of British Columbia, British Columbia, Canada
Brandon Magnus	UG	ELISA-based profiling of mouse-serum samples for identification of early biomarkers for radiation-induced pulmonary fibrosis.	Sept. 2019 – Dec. 2019	Undergraduate 4th Year Research Project Report.	
Mathias Labonte	UG	Development of a method for determining fibrotic area in murine lung Samples.	Sept. 2019 – Dec. 2019	Undergraduate 4th Year Research Project Report.	
Sydney Neumeier	UG	Electrophoresis-induced shearing and unzipping of double stranded DNA.	May 2019 – August 2019	Undergraduate 4th Year Research Project Report.	
Lide Gu	Master's	Reselection based on a silver specific RNACleaving DNAzyme yielding a more active double mutant.	Aug. 2017 – Dec. 2018	Research Article	University of Waterloo, Ontario, Canada
Peter Hoang	UG	Folding of the silver aptamer in Ag10c (Ag+ dependent RNA cleaving DNAzyme) probed by FRET.	May 2017 – Aug 2017	Research Article	
Austin Jabari	UG	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	
Lu Yao	UG	Folding of the silver aptamer in Ag10c (Ag+ dependent RNA cleaving DNAzyme) probed by 2-aminopurine fluorescence.	Jan. 2017 – Apr. 2017	Research Article	
Kim Kleinke	UG	Label-Free Ag+ Detection by Enhancing DNA Sensitized Tb3+ Luminescence.	Jan. 2016 – Apr. 2016	Research Article	

GUEST LECTURES / INVITED TALKS

Title	Date	Event and Organization
'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 DNAzyme-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
'DNAzyme based Ag+ 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

TEACHING EXPERIENCE

Capacity	Course Name	Course Level	Duration	University	Activity
Course Instructor	BIOC410 Nucleic Acid Structure and Function (Online)	4th Year UG	Fall 2020	Dept. of Chem., University of British Columbia, Canada	Course design, Teaching & Grade evaluation
	PHY 305 Cellular Biophysics (Introduction to Biophysics)	3rd Year UG	Winter 2020	Dept. of Computer Science, Mathematics, Physics and Statistics (CMPS), University of British Columbia, Canada	
Teaching Assistant	NE469 Special Topics in Micro and Nano-Instrumentation	4th year UG	Winter 2017	Waterloo Institute of Nanotechnology, University of Waterloo, Canada	Teaching
	Introductory Biochemistry Laboratory	2nd year UG	Winter 2017 Winter 2016	Dept. of Biology, University of Waterloo, Canada	Teaching, Experimental Demonstration & Grade Evaluation
	Chemical Reaction Laboratory	1st year UG	Fall 2017 Fall 2016 Fall 2015 Fall 2014	Dept. of Chemistry, University of Waterloo, Canada	
	Chemical Reactions, Equilibria, and kinetics	1st year UG	Winter 2015 Winter 2014	Dept. of Chemistry, University of Waterloo, Canada	Teaching & Grade Evaluation

VOLUNTARY EDUCATIONAL CONTRIBUTION TO COMMUNITY

Responsibility	Course	Student Profile	Duration	Community
Teaching Volunteer	Hindi language Course	Children of age 6-12 yrs.	Spring 2017 Fall 2017	Toronto Branch, Dayalbagh Radhasoami Satsang Association of North America (DRSNA) [Not-for-profit Charitable Organization]
Course Instructor	Block-Printng Course	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	

SCHOLARSHIPS, HONORS, AND AWARDS

Honors / Awards / Scholarships	Year	Amount
Nominated at the National level by The University of British Columbia, Canada for the highly prestigious ' Banting Post-Doctoral Fellowship '	2019-2020	
Nominated at the National level by The University of British Columbia, Canada for the highly prestigious ' Killam Post-Doctoral Fellowship '	2018-2019	
WIN Nanofellowship , Waterloo Institute for Nanotechnology, University of Waterloo, Waterloo, ON Canada	Sep 2017	CAD\$ 1,000
WIN Nanofellowship , Waterloo Institute for Nanotechnology, University of Waterloo, Waterloo, ON Canada	Sep 2016	CAD\$ 1,000
Graduate Student Association, University of Waterloo, Travel Grant	2016	CAD\$ 500
University of Waterloo Graduate Student Scholarship , Fall 2015	Fall 2015	CAD\$ 2,000
Provost Doctoral Entrance Award for Women , University of Waterloo, Waterloo, ON Canada	Sep 2014	CAD\$ 5,000
Senior Research Fellowship , Council of Scientific and Industrial Research (CSIR), India	July 2013	INR 1,32,000
Junior Research Fellowship , Indian Institute of Technology (GATE), India	July 2011	INR 4,32,000
Combined Biotechnology Entrance Exam Award , Department of Biotechnology, Govt. of India	July 2009	INR 1,92,000